

In This Issue—Better Work Through Ventilation

# MOTOR AGE

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# MOTOR AGE

## Better Work Through Ventilation

by T. M. WILDER

PROBABLY no place in the world, with the possible exception of the crater of Mt. Vesuvius, a Chinese hop joint, or an Esquimaux hut in the winter, has poorer ventilation than the ordinary garage repair shop. In summer, it is a fiery furnace that absorbs through its thin walls all the heat that old Sol can hand down, storing it up from day to day and pyramiding it like a food speculator operating on the unsuspecting public. Many of these shops have no outside windows; there is no way of dissipating the acquired heat, except by the slow process of radiation at night, and before that is accomplished a new day has come and the temperature again has risen.

At this season, this phase of the ventilation problem is uppermost, that is, the phase dealing with keeping the air fresh and cool. In winter, there is a different angle; then we desire to keep the heat but change the air often enough to prevent the undermining of our respiratory system, as motor car business is none too plentiful in New Mexico or Arizona.

All ventilation is classed as systematic and non-systematic. Non-systematic ven-



Welfare engineers have known for a long time that much better results can be had from workmen if they operate in well ventilated buildings. One of the greatest difficulties encountered in service stations generally is poor ventilation, especially of the shop or testing room. In spite of piping the exhaust gases out of the building there remain fumes which, as the day wears on, become unbearable to the workmen. Especially is this true in winter, in shops, where climatic conditions call for closed doors and windows. Mr. Wilder in this story points out some practical solutions to some of the more common evils of garage ventilation and some of these solutions require hardly a dollar's worth of material and labor.

tilation is that which results from open windows and doors, cracks in the walls, and even diffusion through the walls if they are not too dense. This is the method that exists in most repair shops, and, it is needless to say, is very unreliable. Usually, when most to be desired, it is inoperative.

The systematic ventilation is that which is planned and carried out, either by natural or mechanical means. It may operate as natural ventilation in which the principal of the upward flow of heated air is taken advantage of, or it may be produced by fans, or blowers propelled by motors or engines.

Discarding the non-systematic ventilation as unreliable, we will consider the possibilities of the natural form of systematic ventilation, that type requiring no outlay for machinery or power.

Many shops have no windows and are located on the back of the garage in the corner or alongside a party wall. They depend for their lights upon skylights and if their owners have ever thought about ventilation, it is only to curse the foul air, rather than to try to think of a remedy. Usually the condition can be improved a great deal by simply making a hole in the roof at its highest point. This hole may be covered by a galvanized iron ventilator or any cupola arrangement that will let the air out easily but prevent rain and weather from coming in. A stack built of wood or sheet metal over the hole will increase the air-moving power of the hole considerably, acting like a chimney. Every time the height of the stack is doubled, the air-moving power is increased by approximately 50 per cent.



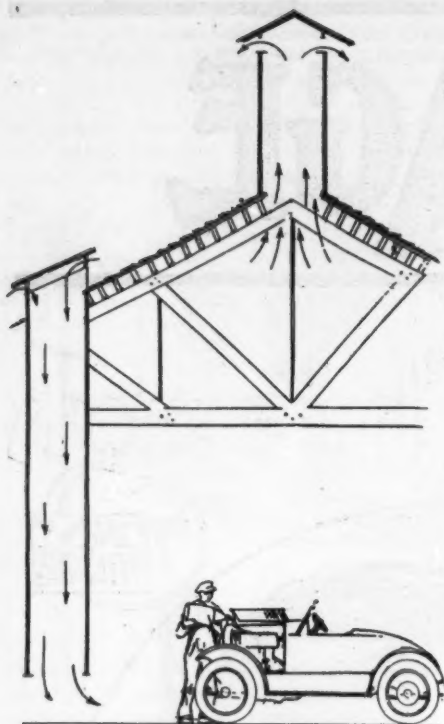


Fig. 1—This may make the shop look like a brewery, but will give fresh air even in the worst locations

A stack 10 ft. in cross sectional area 5 ft. high would move 760 cu. ft. of air where the temperature difference is 10 deg. If the height were 10 ft. under the same conditions, the stack would move 1,080 cu. ft., and if 20 ft. it would move 1,530 cu. ft.

But where is all this air coming from? If there is to be any real ventilation the bad or hot air must be replaced by fresh or cool air. If the replacing air comes into the shop from an outside window or from a cool part of the building, as the sales department or stock-room, it is usually all right but, if it comes from the garage, which is itself filled with gasoline fumes and smoke, nothing is gained.

The only way to avoid drawing in contaminated air is to construct another flue that comes down from the roof and opens at a point near the floor (see diagram Fig. 1).

#### Wind Must Be Considered

Wind plays an important part in ventilation, whether natural or forced. It will put the most carefully designed installations to working topsy-turvy, and usually, where elaborate systems are employed, as in school houses, no one is allowed to open windows to the outside air because the wind would either blow in or out, causing the foul air in some room to back up in the flue and enter another room.

Fig. 2 shows how this might occur.

All natural ventilation is especially susceptible to the effect of wind and is upset by a very slight difference in pressure, since its operation depends on such a slight difference in weight between hot and cold air.

If there is a high wall beside the build-

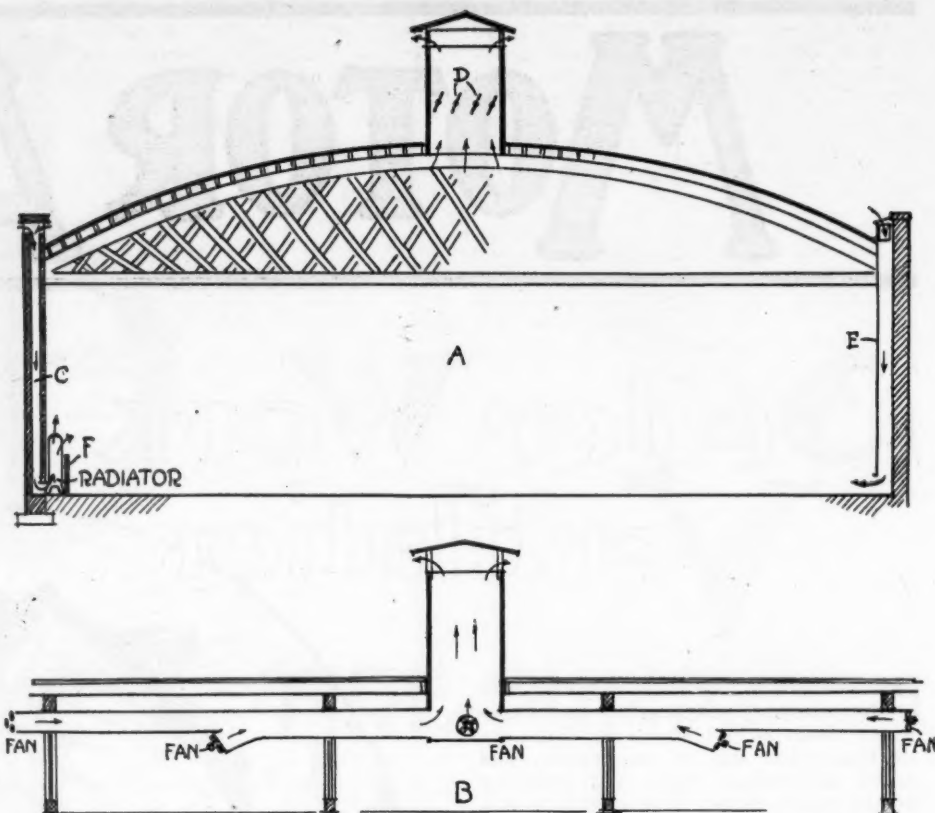


Fig. 3—Here are two systems for the shop which are comparatively inexpensive to install and under ordinary conditions will give perfect results

ing, then one will be obliged to extend the ventilating stack to the top of the wall, if one expects to get any effect while the wind is blowing.

Forced ventilation, produced by force and blowers, must not be confounded with the mixing or stirring-up action of ordinary electric fans. The action of the latter is not ventilation at all. They simply create an artificial breeze, which blows against moist surfaces of the body, causing evaporation, which in turn causes a sense of coolness and, in reality, does cool slightly but does not ventilate or

change the air. This type of ventilation is more positive; less at the mercy of winds and in every way more reliable; but it is expensive, the steady grind of motors, day after day, piles up quite a bill for power by the end of the month. Consequently, it would seem advisable that a combination system of some sort would answer the purpose.

There are many days when there is no smoke in the shop, the weather is pleasant, air circulates freely, and no ventilation is needed; then there comes a time when all the carbureters in the

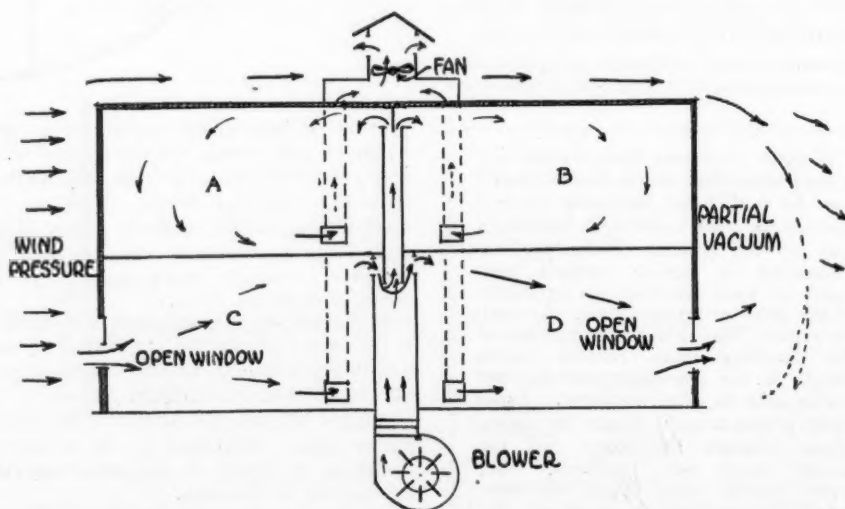


Fig. 2—If window on both the windward and lee side of a building are opened, wind pressure would upset any systematic ventilation that might exist. For instance, foul air from room C would be forced back into room D and, if the wind were strong enough, it might throw the whole system out of step



country seem to need adjusting. The shop is full of smoke, the garage is the same, the weather is hot, there is no breeze, and one nearly dies of suffocation. At such times, it would be worth many times the expense to start the fans and in a few minutes have good, clean, fresh air.

Fig. 3 is a layout that may be installed in any shop at comparatively slight expense. A is a cross section of a typical shop, 50 ft. wide by 30 ft. deep, at the back end of a garage building. The roof is supported by lattice trusses. On top of the roof a stack is built which is 3 or 4 ft. in diameter and 10 ft. high. If there is a truss through the middle or near the middle, place the stack over this, not only for the support but so that the stack can draw from both sides. The stack will give an outlet for all the hot air and smoke that collects under the roof. If the shop has windows in the rear they will furnish fresh air to take the place of that which escapes. Sometimes, however, the building is entirely surrounded and no windows are available.

If the building is not yet built, install several flues, C, to make about the same cross sectional area as contained in the stack; or more, as there is much more friction in small flues but, if the building is already up, sheet metal ducts, E, will be just as good. If after these natural means have been applied and, at times, wind pressures in certain directions upset their action, it may be found necessary to help out the action with fans of some kind. No high-powered installations will be found necessary, however, as, in most cases, there will only be a slight resistance to overcome.

#### Ventilation Not Needed Always

In the winter this arrangement will be specially effective but some means of heating the incoming air, or at least tempering it, as at F, will be found necessary. Also a damper, D, will be necessary to cut down the outward flow when too strong or when ventilation is not needed.

Any system of ventilation is wasteful when not watched. Whether power is being used to exhaust air when unnecessary or perfectly good heated air is allowed to escape through the stack, the effect is the same. Always have the system under control, then you will get what you want, when you want it.

B, Fig. 3, shows how the above system may be used on a larger scale. Galvanized iron ducts lead from a centrally located stack and at intervals branch inlets are installed. At each inlet is placed an electric fan of the ordinary office type, 12 to 16 in. in diameter. These little fans will do wonders toward exhausting the air, are comparatively inexpensive, and consume very little current. They may be arranged so that by convenient switches any one or all of them can be worked at once.

In the summer it may be considered pleasanter by some to get the benefit of the breeze kicked up by the fans. Fig. 4 shows an extensive way of doing this

in a 25 by 50 ft. shop. Here the incoming air through the down ducts in the four corners is driven directly out into the room at such an angle that the four fans set up a whirling motion, keeping all the air in the room moving around and upward until it goes out of the central stack in the roof.

Where a chimney of a heating plant is available, D, Fig. 5 shows a very good means of inducing a strong circulation without expense. It consists of a metal smoke pipe installed in the center of a ventilating shaft. Heat from the stack is imparted to the air in the shaft which causes it to rise with a strong action. This arrangement is of no use in summer, if the chimney belongs to a heating plant.

#### Uniform Results Difficult

It is difficult to get uniform results from anything but a vertical shaft in either natural or forced ventilation. A fan, exhausting air through an opening in a side wall, will make poor headway against a wind blowing in; the stronger one will win. B, Fig. 5, illustrates this. A shows how a vertical shaft is unaffected by wind, and C shows how a revolving hood, which keeps the opening always on the lee side, will aid in exhausting the air.

Many times ventilation is well taken care of by natural means in warm weather, but it is found difficult to get a change of air in the cold weather without making cold draughts that are

very disagreeable to the workmen. This condition is especially prevalent in the northwest where the winters are extremely cold.

After everything is said and done about winter ventilation, and about that part of summer ventilation which refers to purification rather than cooling, the writer believes that a preventive is really better than a cure. If care is taken to avoid the pollution of the air by exhaust gases, the air supply of the average shop should need no treatment whatever.

#### Pipe Over Engine Exhaust

With that end in view, why not use a system prevalent in factories, engine testing rooms, etc. This consists of a main pipe of sheet iron, as stove pipe, or large gas pipe leading to the outside through the roof or sidewall and supported overhead by suitable means. At intervals, in convenient locations, inlets are dropped to within a few feet of the floor. These latter pipes have pieces of hose attached to them of a size suitable for slipping over the car exhaust pipe. With this apparatus installed there need be no more smoke or exhaust gases in the shop but there could be nothing of this kind in connection with the garage, so that it would be best to partition the shop, or at least the portion where the men work most, off from the garage in order to keep the foul garage air from freely circulating into the shop.

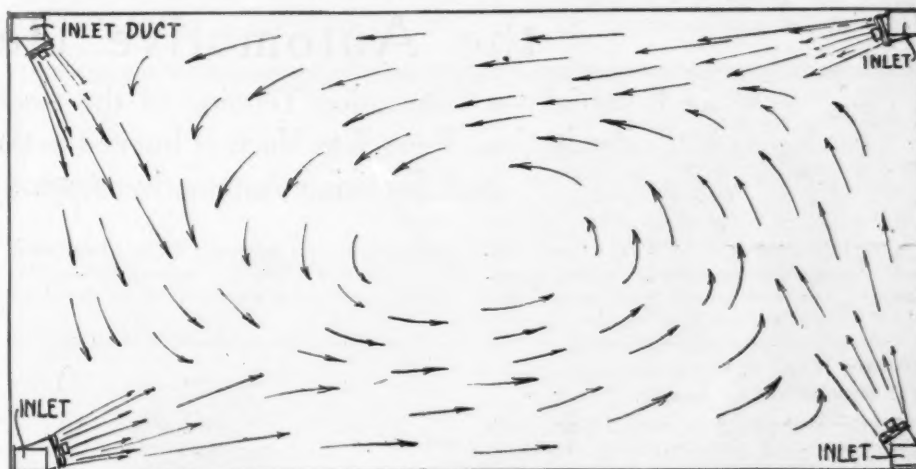


Fig. 4—Fans may be stationed at openings in the wall or at the foot of ducts and directed so that they force the fresh air in such a way that all the air in the room is kept in motion

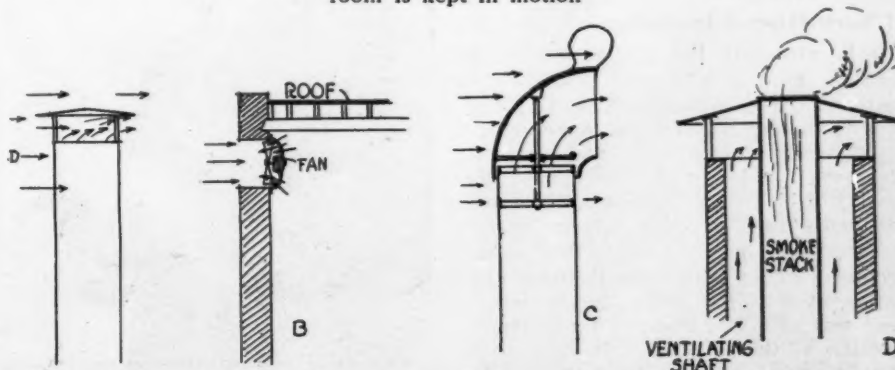


Fig. 5—The vertical ventilating shaft alone is unaffected by wind pressures. Whether natural or forced draft is used, wind offers resistance to movement of air, unless the movement is at right angles to the wind direction



All of the sessions were not given over to technical matters as this game of baseball will show. The afternoons were devoted to sports of all kinds

## What the S. A. E. Summer Meeting Means to the Automotive Dealer

While Essentially a Convention Tending to the Good of Engineering and Production, There Was Much of Interest to the Man Selling and Servicing Automotive Apparatus

**O**TTAWA BEACH, MICH., June 25— Fuels, transportation, power-farming and production problems formed the chief items of interest so far as the automotive dealer is concerned, at the five-day S. A. E. summer session which was concluded here to-day.

While essentially a convention tending to the good of engineering and manufacturing of automotive apparatus, it was, nevertheless, a convention of paramount interest to distributors and dealers of such apparatus.

### Of Much Interest to Dealer

It is, after all, the dealer who must keep the product sold and the more the dealer can find out about what is being done in the engineering and manufacturing of the product he sells and services, the better able he is to shape the destiny of his future business. The present acute fuel situation affects manufacturer and dealer alike. Production problems affect both manufacturer and dealer, likewise the roads. Hence, whatever was said and done at the summer meeting of the S. A. E. this year, to a certain extent, at least, is of interest to the man selling and servicing motor cars, trucks and tractors.

The present day fuels was a topic discussed probably more intensively than

any other. As a result it is likely that the future will see an increased use and more intelligent application of the hot-



David Beecroft, directing editor of The Class Journal Co., nominated for the presidency of the S. A. E.

spot, whether this be incorporated in the manifold design, or applied in some manner between the carburetor and engine. Heat is essential to the vaporization of the present-day fuel but this heat must be intelligently supplied, or regulated in order not to cut down engine power.

### Smaller Engines Needed

In spite of application of heated manifolds, hot-spots, etc., it is more than likely that in the immediate future we may expect to see fuel conservation measures as one of the existing expedients towards a solution to the fuel shortage. R. L. Welch, general secretary of the American Petroleum Institute at Tuesday morning's meeting brought out the fact that in the first four months of this year we used up more fuel than we produced. He sought the co-operation of engineers with the oil refiners to solve the fuel problem. One of the most important thoughts coming from Mr. Welch's talk was the existing need of a light car powered with a small, but very efficient engine.

Mr. Welch took the stand that it seemed utter folly for a man driving a car, often alone, powered with an engine that had a potential horsepower of something like seventy or even ninety



horsepower. We might liken the situation to one of using a battleship to cross the Hudson River. The meat of it all seems to be that we are wasting fuel in propelling heavy passenger vehicles fitted with too powerful engines, especially when such engines seldom are called upon to deliver all this power. No doubt the future will see smaller engines, whose power output is properly handled through more efficient gearsets, such as the all-in-mesh type.

There was some discussion on the advisability of an embargo on fuels, but this seemed unwise in view of the fact that the United States already is importing considerable oil from Mexico and that before long our imports will greatly exceed our exports.

H. L. Horning of the Waukesha Motor Co. presented the report of the Automotive Fuel Committee and eliminating all engineering terms so as to put the result of the committee's findings in plain English it resolves itself into something like the following: there are a few spots in the intake manifold where raw fuel collects and if these spots are heated properly, the problem is solved. While this is a crude way to put it, it tells the story. Mr. Horning mentioned some very interesting matters in connection with turbulency, or the agitation of the gases in the combustion chambers of an engine. More of this is told elsewhere in this issue.

#### Standardization Important Work

The matter of standardization is, perhaps, not so well known among dealers of automotive apparatus as it might be. Standardization has played an important part in the service work incident to motor cars, trucks, tractors, etc., and shows to advantage, for example when a service man is called upon to substitute for a certain part of one car with that of another, knowing they will interchange without any difficulty.

Monday morning was given up to the presentation of the report of the Standards Committee. In this connection it might be interesting for the dealer to know that to date two hundred and sixty parts of automotive apparatus have been standardized. Thus, fifty-three tractor parts have been standardized, sixty-two marine parts, one hundred and twenty-nine truck, one hundred and sixty-eight passenger car, fifty airplane, eighty-two light plant, eighty-two stationary engine and fifty-eight motorcycle. Naturally the greater the number of automotive parts are standardized, the less the number of parts the dealer will be called upon to stock, especially if he handles trucks and tractors in connection with motor cars.

Wednesday's session was devoted to transportation questions, with J. G. Vincent presiding. Motor bus transportation, motor transport discussion, proposed S. A. E. program on science of truck operation, air navigation, inland waterway transportation problems and similar subjects formed the chief topics for discussion. It was brought out at

the meeting that the ten cent fare must be maintained if motor buses were to give satisfaction. The establishment of jitney services was depreciated. The paper on the relation of the motor transport corps to commercial transportation emphasized the increasing importance of motor transport in modern armies and indicated that the United States army was making and would continue to make every effort to keep abreast the times in this matter. Great effort now is being made towards a standardization of body design as well as standardization of specifications for the parts and accessories for army trucks.

In the paper Perpetuation of Our Highways it was urged that there should be close co-operation between automotive and civil engineers, inasmuch as the problem of concrete roads is within the experience of railroad builders.

#### Paper on Manifold Temperature

The fuel session which began Tuesday was continued Wednesday afternoon, W. S. James presenting a paper on Intake Manifold Temperature and Fuel Economy. Mr. James gave the results of numerous tests made by the Bureau of Standards and showed by motion pictures what happens inside a glass manifold at various temperatures and throttle openings. He summed up by stating that the temperature of a manifold as affecting the output was relatively unimportant as far as the steady running

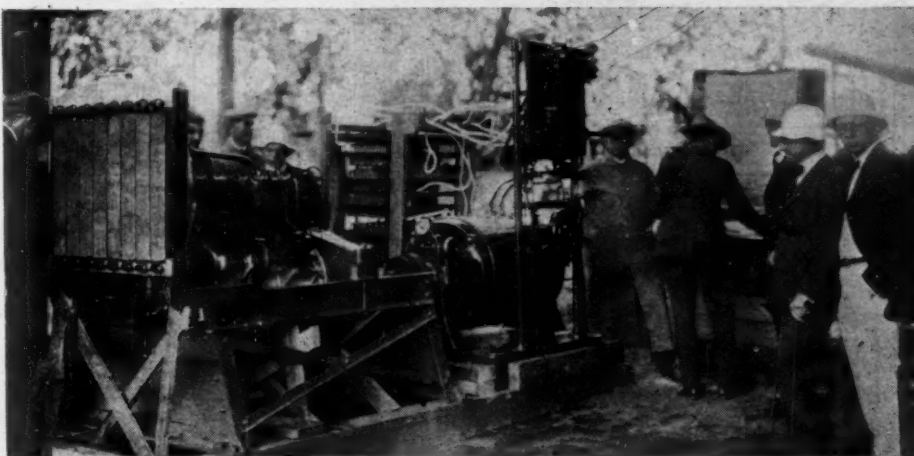
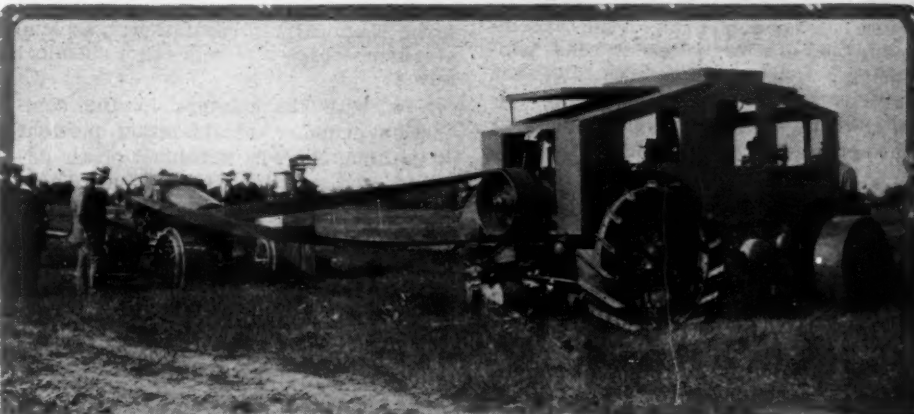
of the engine was concerned, but was very important in acceleration.

In the farm power session on Thursday morning a very interesting talk was given by R. W. Lohman on power farming in general. Mr. Lohman showed the application of tractors to all kinds of agricultural equipment, running into apparatus of several hundred horsepower. The most interesting machine was a field thresher in which grain was threshed on the fields and made ready for delivery to the railroad simultaneously with the reaping. The thresher was pulled by the reaper.

#### AIR PRESSURE WARNING DEVICE

Atlanta, Ga., June 26.—An invention that, it is claimed, will be the means of adding several additional miles to the life of the average automobile tire has recently been patented by W. A. Harris, of Greenville, S. C., and is to be manufactured in that city by the Harris Accessory Co. The device is now being made in the East, but the new company has been formed and applied for a charter.

This device consists of a simple brass contrivance which is attached to any tire valve. It is automatic and may be set to give the alarm at any desired pressure. When the minimum pressure is reached at which the alarm has been set the device emits a continuous whistling sound which ceases only when more air is pumped into the tire.



The Waukesha engine connected to a Sprague dynamometer which was used in making tests on heated and unheated manifolds. Above, tests being made with an International Harvester tractor in the Herrington farm



# What Happens in the Combustion of an Engine

Turbulence, a New Factor Entering In the Study of the Heavy Fuel Knock, as Brought Out by H. L. Horning at the S. A. E. Summer Meeting

By ROY E. BERG

OTTAWA BEACH, MICH., June 25.—“Turbulence,” as interpreted from the meeting of the S. A. E. at Ottawa, seems to be the hitch where the solution of the fuel problem now hinges. Associated with “Turbulence” is the whole theory of fuel combustion and since this is a much involved subject of an extremely technical nature, an explanation of what takes place within the cylinder is in order before taking up this latest theory of the fuel situation as it confronts the combustion engineer.

As we all know, the heavy fuel sold on the market today has created the phenomena known as the fuel knock, variously known as detonation, pinking or the ping. The fuel knock is the cause of all the trouble. Because of it an engine loses power very rapidly. Ordinarily the objectionable knock is corrected or remedied partially by lowering the compression pressure or retarding the position of the spark. Many service departments have found it advisable with cars of early origin, say cars of 1914 or 1915 design, to place a gasket of  $\frac{1}{8}$  in. thickness between the cylinder head and the block or between the cylinder block and the crankcase, or if the engine has no detachable head, by employing pistons of a lower head construction. All of these remedies are conducive toward a reduced power output, and this is the problem that is confronting the engineers to-day.

In the first place, the detonating effect is not a metallic knock. Impact of metallic bodies such as a loose wrist pin or a piston slap are knocks produced by

worn or defective installation. The detonation is a knock caused by a wave of rapidly burning gas impinged or hurled to the surfaces of the combustion chamber.

Kerosene, or the ordinary low-grade gasoline has as its make-up a very complex chemical structure. Lest memory fails to recall what chemical structure implies, the familiar formula  $H_2O$  represents one molecule of water. This means that two atoms of hydrogen are combined with one atom of oxygen to form one molecule of water. A molecule, of course, is the smallest division of matter that can be made. Breaking the molecule up into its constituent parts brings us to the prime elements composing the molecule. The chemical composition of gasoline may be conveniently represented by the formula  $C_8H_{18}$ . This is good gasoline and chemically would be known as Hexane. Kerosene because of its heavier body has more atoms to its molecule and its representation might for illustration be termed  $C_{16}H_{34}$ . It is not to be understood that this is the exact formula of kerosene, because kerosene as it is sold to-day probably has no exact chemical representation; gasoline also is unrepresentable in exact chemical terms.

Now with the mixture in the combustion chamber, at the exact moment of ignition, there is a volume of air admixed with small particles of fuel. These particles are very close together, and are in the liquid form. When the spark occurs the most volatile parts of the mix-

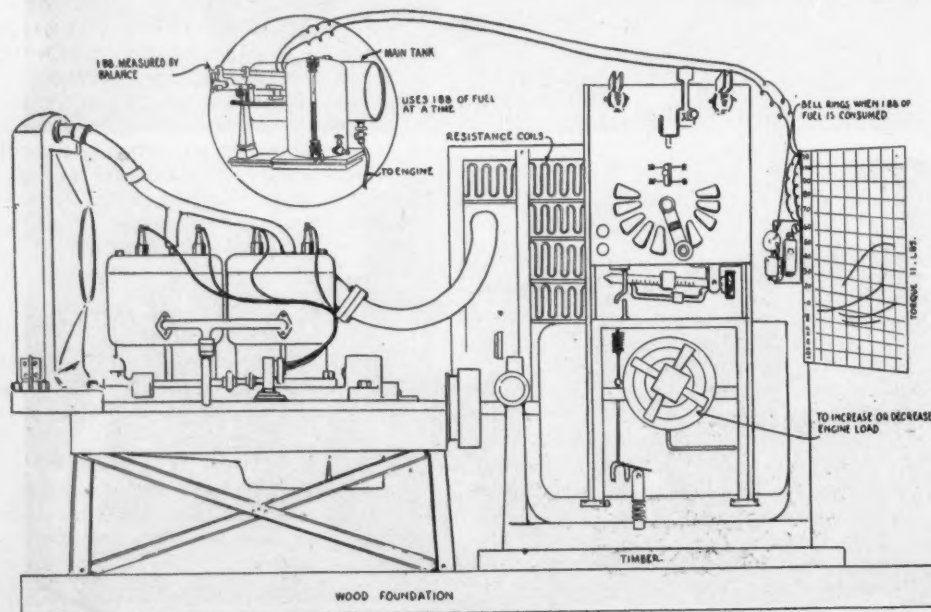
ture ignite, forming a spherical ball of burning mixture. This sphere, if we may term it so, at the moment of ignition does not grow very rapidly. There is a period of hesitation at this ignition moment, a sort of stuttering or faltering action. Once this slight hesitation is past though, the flame becomes hotter at an astonishing rate and the sphere grows in proportion at a high accelerated rate.

With the mixture burning and the piston traveling on its downward stroke, this detonation occurs. Photographic records prove that the knock occurs approximately 15 deg. after the piston has started on its downward travel. A remarkable chemical change transpires at the moment of the detonation. The fuel molecules break up structurally. Whole new compounds are formed. When the fuel breaks up the bonds or the affinities that each of these atoms has for the other are released. To gain a picture of what this breaking up means, let us take a drop of water as an example. Physical force applied under ordinary means will not break this drop of water up into its component parts, hydrogen and oxygen. If we boiled a drop of water and turned it into steam and passed the steam through a red hot iron pipe, the drop of water would be changed into its component parts. Thus, it is easy to appreciate that a good deal of energy is needed to break the fuel molecule up into its prime constituents. When the breaking up action takes place the hydrogen atoms and carbon atoms are momentarily separated before they recombine. During this infinitesimally small period of time the knocking action commences.

## Theory of Combustion

Hydrogen has the property that it burns with extreme rapidity. In fact, hydrogen burns sixty-five to seventy times faster than a perfect mixture of compressed air and gasoline. With these millions of hydrogen atoms liberated and having the power of extraordinarily rapid flame propagation, the combustion in the mixture darts from one hydrogen atom to the next at a much greater speed than the rate at which the rest of the mixture burns, which has by this time recombined into a new and more easily burned hydro-carbon. These hydrogen atoms then serve as minute spark plugs, and the flame darting from each hydrogen atom to the next builds up a very rapidly advancing, intensely heated wave. This wave advancing to the side of the piston wall of the piston head, or the valve pockets, slaps these surfaces and produces the effect known as the detonation.

Practically everyone agrees with this



Sketch of testing outfit used in Mr. Horning's demonstration to illustrate the success he has attained with his method of operation

theory of combustion as applied to the present day gas engine. On the question though of correcting the evil there is not the unanimity of opinion that might be expected. There are two factions, or two schools of thought regarding the remedy for the fuel knock; one solution is advocated by C. F. Kettering, Chief Engineer, General Motors Corp. and the other is headed by H. L. Horning of the Waukesha Motors Company. These two authenticators are not opposed to each other. Each school of thought acknowledges the methods of the other.

Mr. Kettering has demonstrated that the addition of aniline or iodine in small quantities of one to two per cent to the fuel will eliminate the knock however pronounced its tendencies might be. The following table shows the orders or the tendencies of various gas engine fuels toward detonation:

(The percentages shown are based on ether being the worst offending fuel. The other fuels are compared in per cent to ether.)

Fuel	Per Cent
Ether .....	100
Paraffines .....	96.0
Olefines .....	86.5
Napthenes .....	85.5
Aromatics .....	54.0
Alcohol .....	60.0

So successful is the addition of aniline or iodine to the fuel, that an engine burning ether and designed for the worst possible conditions, i. e., conditions most likely to produce knocking, will function perfectly with the addition of either of these chemicals. In fact Major Schroeder would not have been able to break the world's altitude record had not a quantity of iodine been added to his gasoline. Major Schroeder found that upon reaching an altitude of approximately 32,000 feet the engine in the plane commenced to knock in a most pronounced fashion. On the next attempt 4000 feet was added to the altitude of the plane.

#### Adding to Fuel Increases Cost

The addition of these chemicals to the fuel presents a complete solution to the fuel problem. By the use of this method engine design need not be altered to compensate for the low grade fuels. However, there are limiting factors in the wide application of this method. One is that the quantity of iodine, aniline or other coal tar extracts is somewhat limited in its supply. Then the addition of this material to the fuel would probably add two or three cents to the cost of gasoline per gallon.

The other school of thought represented by Mr. Horning is endeavoring to correct or compensate for the knock by efficient design, and this is where the factor "turbulence" enters our story.

It will be remembered from the above that the the moment of detonation a wave crest is formed which radiates spherically from the spark plug electrodes at an extremely rapid rate. Now, if a condition could be created where the spark would be fired at the ideal position,

with other conditions as favorable as possible, so that the mixture would burn to its completion at a rate so rapid that the detonating wave would not have the opportunity to build up to its maximum, then the knock could be eliminated. This is the aim sought. The factors that control these ideal conditions are spark plug position, elimination of parallel surfaces within the combustion chamber and turbulence.

Recent experimentation with spark plug positions have demonstrated the fact that with the plug in some pistons, the rate of flame propagation in the cylinder is so materially reduced that starting becomes almost impossible. In an L-head engine it has been found that a plug is not ideally located if over the piston center. By elimination of parallel surfaces is meant that the piston head

SOME SHAPES ARE BETTER THAN OTHERS

HE MEANS COMBUSTION CHAMBER SHAPES



MR. H. TURBULENCE HORNING

should not be absolutely flat nor should the top of the chamber over the piston be flat. The valve pocket in an L-head engine should have no parallel surfaces.

Turbulence, though, is perhaps the biggest factor of the three. Good turbulence would be described as a cyclonic effect taking place within the cylinder at the instant of ignition. The gases should have a whirling motion. They should move very rapidly. Any pockets which are not correctly designed will tend to dampen the cyclonic or surging action of the gases and this is one of the features that must be avoided if good turbulence is to be had. When the gases are in violent circulation within the cylinder at the instant of ignition, the spark is better able to function. The mere friction produced by the gases sweeping over the head or the sides of the combustion chamber exert a marked dampening influence on the surging of the gases. Because of this the spark plug points must be inserted with discretion. It is probable that a 1-32 in. from the combustion chamber surface the gases hardly move. At 1-16 in. from the surface the gases are circulating rapidly and at 3-32 in. the gases violently surge back and forth. The stratified portion of the mixture closest to the surface is probably very lean and a spark ignited in this portion of the mixture is not conducive toward rapid prop-

agation. At the outward position where the gases swirl rapidly we have a richer mixture, and if ignited at this point the flame propagation is much more rapid.

With the above consideration in mind it can be seen that the projection of the points exerts a marked influence on operation, and equally as important is the position of the plug relative to the chamber itself. If the plug is located in one corner of the combustion space the detonating wave which is emanating at a rapid rate will gain its maximum speed before it reaches the opposite wall. This will produce knocking. But if the plug is located so that the wave crest of detonation has not had opportunity to reach its maximum rate before reaching the opposite wall, and before the mixture itself has practically completed its combustion, then the knock will have been eliminated.

#### L-Head Power High as I-Head

This method, although involving considerably more labor than the other scheme of dropping a few gills of liquid into the fuel, has almost reached the stage of perfection. Mr. Horning had on exhibition a complete dynamometer test stand with an experimental engine which was demonstrating the soundness and correctness of the principle. In fact success has attended his efforts so far that he was producing efficiencies with an L-head engine equivalent to I-head performance.

#### SEES NO RAISE IN CALIFORNIA GAS

Sacramento, Calif., June 27—The gasoline situation has become more acute in the last week, and there is hardly a city or town in California where fuel can be obtained after mid-day. The supply is given the service stations early in the morning, and by noon is exhausted. The Shell Oil Co. still sells in unlimited quantities when it can get the supply, but the restrictions of two and three gallons and not more than half a tank, imposed by the other companies, have run the Shell supply short many times.

President Kingsbury of the California Standard Oil Co., denies any knowledge of the oft rumored 30-cent gasoline in July, and asserts as far as he knows, the 24-cent figure will stand. The last increase was March 17, when the price was increased two cents from 22. Commercial cars, automobiles used for business, and tourists, are being given the preference in supplying the fuel.

#### TRAILER GAINS FAVOR IN DELAWARE

Wilmington, Del., June 25—The motor trailer is becoming popular in rural Delaware, particularly in the lower part of the state, where there are sandy roads and large trucks are a novelty. They are being used a great deal by farmers who are combining pleasure with business in the matter of automobile ownership. The trailers are attached to passenger cars, and in that manner produce is hauled to the towns and railroad stations and return loads are carried, while hauling about the farms is also done.



# S. A. E. Recommends the Hot Spot Manifold

While This Type of Manifold May Not Be the Ultimate Answer, It Is, Nevertheless, Recommended Because of Its Superiority Over All Existing Types

**A**N intake manifold of the hot spot type is that recommended by the Society of Automotive Engineers. As we all know the change in the fuel has created conditions that in many cases have made early type cars inoperative. The fuel has become so heavy that the end point, which is the temperature at which the last trace of a sample of the fuel boils away, has reached temperatures over 450 degrees. Many lubricating oils offered for sale have flash points less than 450 degrees, and with the cheaper oils of this time we are actually boiling the lubricating oil before we burn the end point of the fuel.

A committee of the society for the last few months has been making exhaustive tests relative to the determination of some system whereby the problems presented by the heavy fuel might be solved. After long and elaborate research, after experimenting with pre-combustion types where auxiliary exhaustion chambers are used to burn a

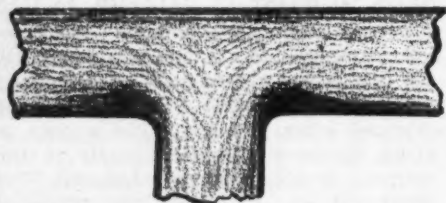


Fig. 1—Showing how the fuel in liquid form accumulates along the inside of the bends and actually builds up in small puddles at the turns

portion of the mixture and reinject the hot gases back into the intake manifold, and after experimenting with manifolds heated from outside sources, it has been determined that the exhaust gas heated hot spot presents the most simple and effective means of solving, or at least aiding in the solution of the fuel combustion problem. The committee which drafted the recommendation admitted that the hot spot manifold is not perfect, and that it has shortcomings, that it is lacking in certain respects which places certain limitations upon its operating range. Nevertheless, the hot spot type manifold has been offered, but the exact construction of the recommended hot spot of course could not be detailed because the most suitable construction is probably not yet known.

One thing that has been positively demonstrated in connection with the hot spot manifold is that the proper place to apply the heat is not so much to the

top or to the outside of the bend and curves, but to the inside. This may seem very strange for at first thought it might appear that the heavier portions of the fuel because of their greater inertia should follow the outside of the bend and the lighter portions the inside. If we reflect for a moment how coarse gravel behaves when carried in a concrete mixer, it will be remembered that the heavier and larger stones are carried to the inside of the bend, where the motion is comparatively much slower. The lighter particles are carried to the outside of the bend where the motion is rapid. This in a crude way represents the action inside the intake manifold,

## Manifolds of Glass Show Action

Professor James of the Bureau of Standards demonstrated during the convention that this was an actuality. He constructed intake manifolds of Pyrex glass and photographed the manifolds with a moving picture machine during operation. From these pictures it could be seen that the heavier portions of the fuel accumulated on the inside of the bend and in cases where the vertical riser of the manifold connected with the horizontal section, small puddles of fuel formed. Fig. 1 depicts just how the fuel accumulates at positions as described. From this it can easily be appreciated that the proper place to apply any heat is at the inside of the bend. Confirma-

tion of this has been demonstrated by actual construction.

Since, as explained above, the heavy portions are conveyed to the cylinder on the inside surface of the intake manifold, it is not incorrect to assume that practically all of the fuel is carried close enough to the inside surface of the manifold so that the lighter portions together with the heavier portions will constitute a stratified film of varying degrees of fuel composition. This is in effect what takes place within the manifold, according to the information gleaned by the committee in their research work. With this theory of surface conveyance confirmed, a new light has been brought to bear upon manifold design.

It is now agreed that proper intake manifold construction is one of surface distribution and not volumetric proportionment, and some engineers have gone on record stating that if the manifold did no more than distribute the fuel to the cylinder according to the surface theory, enough would have been accomplished. O. H. Ensign of the Engine Carburetor Company holds to this theory, and for confirmation points to the construction he has employed for the last few years which enables him to start cold with kerosene.

It goes without saying that high gas velocities must be used in combination with low grade fuel. For most satisfac-

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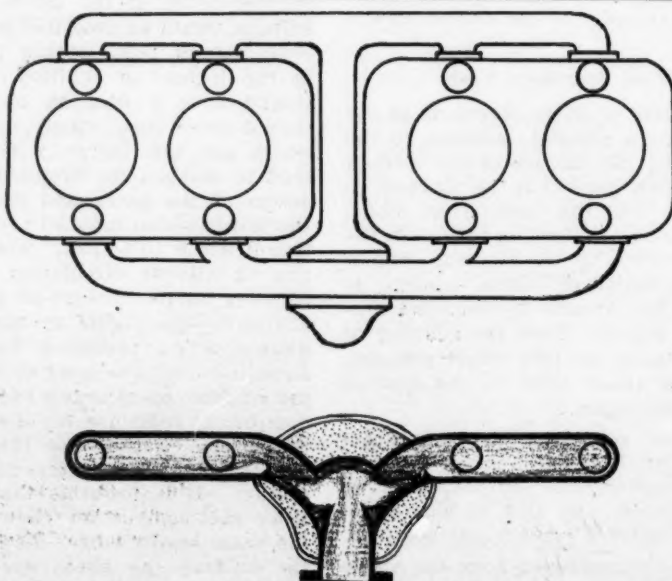


Fig. 2—A type of manifold described by Mr. Scarrett of the Minneapolis section. This manifold is very successful in its operation and overcomes the objectionable features of loading encountered so commonly with the present day fuel





## A COMPLETE SERVICE STATION

ONE of the most modern and up-to-date distributing and service stations to be found in the country is that of Rowe, Young & Cooley—Westcott distributors for Chicago, northern Illinois, and part of Indiana.

Starting in 1911 in a little building 25 ft. by 100 ft., they have grown until their new quarters takes in a frontage of 150 ft. and a floor space of over 32,000 sq. ft. In every department has been installed the last word in modern equipment and methods.

The floor space has been divided into three main sections. The first includes the office, service station and stock room. The second takes in the battery service station and store room for used cars; while the third is devoted to the sales department.

In this last is a sales room devoted to new cars which is particularly attractive both as to furnishings, lighting and space design. Five cars can be displayed here to a very good advantage.

Entirely separate from this room is one devoted to used cars—having a capacity of twelve cars; and another storage space for twenty-five cars ready for delivery.

### Well Ordered Stockroom

The service stockroom is worthy of particular attention—not only because it is one of the most complete in the city of Chicago, but because of the method used in cataloging the contents for the benefit of the business office. This stockroom is of sufficient size to keep on hand at all times a complete and ample stock of parts. There are some 1500 of the bins made entirely of metal. A novel feature is the adjustable tire and rim racks, which can be easily changed to accommodate any size of tire or rim. The method of cataloging the stock is simple but comprehensive. A sample of the card catalogue is shown here. On it is given all of the information relative

to each part necessary to tell at any time just the contents of his stockroom without going into it. Indeed, the card index may be taken to the adding machine

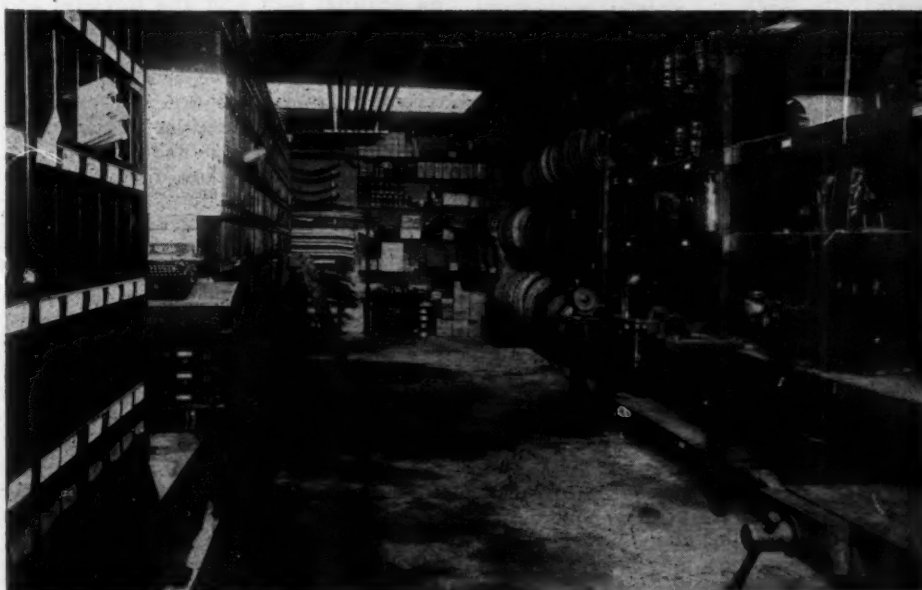
and a complete inventory taken of the entire stock in a very short time. Space is also given for showing the fluctua-

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Name					Bin No.			
Model								
Cat. No.			Price		Part No.			
Date	Quan. Ordered	Quan. Recd.	Order Number	Invoice Number	Out		Bal.	Value

This card is hung over each bin and tells at a glance the stock on hand. A complete

This card is hung over each bin and tells at a glance the stock on hand. A complete inventory can be made in short time by taking the cards to the adding machine



There are about 1500 bins made entirely of metal in the stockroom of Westcott service station in Chicago. On the right is shown the adjustable tire racks which can be changed to accommodate any size tire or rim

# What Is Wrong With Present "Automobile News"?

Action of New York Newspapers in Barring Mention of Car Names, Indicates That "Publicity" Has Been Conducted on Radically Wrong Basis

BY LAMBERT G. SULLIVAN

SOME weeks ago publishers of newspapers located in New York City took a step which has long been anticipated by keenly observing advertising and newspaper men. They entered into a gentlemen's agreement whereby all mention of trade names of automobiles and automotive equipment is absolutely barred from the columns of their publications. In the future an automobile is an automobile, whether it is a Ford or a Rolls-Royce. The reader will have the privilege of guessing what sort of car is meant when mention of automobiles is made.

The ruling extended so far that even in the reports of the Indianapolis race the names of the cars were omitted. The stories told that Gaston Chevrolet won the race, but he might as well have been driving a Chinese Mercedes as a Monroe, for all the public knew. They knew that Gaston Chevrolet won, his time, his miles per hour, his total winnings, etc., but they had to guess at the make of car he drove. All of which made the newspaper accounts highly uninteresting to the only persons who read them—the people who wanted to know what car and driver won the race.

All of which may be "old stuff" to most of our readers. And if it were only news that the New York papers had made this ruling it would be worth two lines back in the news section.

## Reflects Nation-Wide Attitude

But MOTOR AGE does not believe that it reflects only the attitude of New York. It believes that the action of the New York publishers may reflect the attitude of newspaper publishers throughout the United States and it believes it is highly important for its readers, the dealers of the United States, to know something of the circumstances which prompted this action.

Perhaps some of the statements made here may be unpalatable to some of our readers, especially those readers who may be connected with factory advertising departments. But we believe that our readers want the truth about things affecting their business, however disagreeable that truth may be.

From the editorial "we," I am going to switch to the personal pronoun, singular, because I wish to get a little chummy with my readers and because I wish them to know that I have some authority for some of the things I say. So, first of all,

*In this article, which is the first of two, the writer has put himself in the position of the newspaper editor in order to point out just what is wrong with the automobile publicity of the present time. The utmost frankness is observed in this criticism, for MOTOR AGE believes that dealers are entitled to know just what is wrong with present publicity.*

*Mere destructive criticism, however, would be of no benefit to the automotive industry, so the second article of this series, which will appear next week, takes up a constructive criticism of publicity and endeavors to point out how it may be changed and improved.*

I am going to tell you something about myself.

For more than ten years before becoming associated with MOTOR AGE I was a sporting writer with The Chicago Daily News, one of the largest afternoon newspapers in the world. From sports about ten years ago, it was only a natural step to the automobile department,—first covering races, tours and other such endeavors as smacked of sporting interest, and then taking over the general run of automobile news.

## How Newspapers Regard "Publicity"

That isn't an uncommon story—in fact it was the story of about every automobile editor of my time. But perhaps I was an exception in that I remained an editorial man first and foremost and was an automobile man secondarily. Most of my contemporaries became automobile men and secondarily editorial men. Most of them are now either in the automobile business or in the advertising business; in fact when Ed. Spooner left the Detroit Free Press recently, it meant that the last of the editorial-men generation of automobile editors of the big papers in the middle west had quit the business.

This is a lengthy digression for so uninteresting a subject as my life. But I hope it will be pardoned as introducing me to my readers. I don't think I could tell you what I have to say without giving myself a pretty lengthy introduction.

That is why I say that keen advertising and newspaper men have long expected some such action as has recently been taken by the New York papers. The only thing which is surprising is that it has been so long delayed. When I first began editing the "automobile publicity" which came to me eight years ago it seemed to me absolutely incredible that newspapers were publishing any of the stuff sent in to them. I expected the big blowup to come every week—and

here I've been waiting eight years and have only heard the preliminary explosion! But at last it has come, and I believe this explosion will be followed by others.

For the stuff sent in by the factory publicity men was unbelievably bad. We automobile editors had a trade name for it. We called it "garbage." It was "Podunk Six Garbage" or the "Universal Four Garbage." Garbage was such a simple and such an expressive word to describe automobile publicity.

When I was put in charge of the automobile department, my managing editor gave me explicitly to understand that I was in charge; that I was editing the section and that I would be judged by results alone. I asked him whether those results were going to be measured from the viewpoint of editorial worth or of advertising gained. And right there I nearly lost my new job. He informed me very succinctly and with short, well chosen adjectival and adverbial accompaniments that I was an editorial man and that the advertising department didn't exist as far as I was concerned.

## Linked up with Advertising

So I made a real and earnest effort to make an automobile section which would conform to the rules of reputable journalism. It was quite evident almost from the start that I was going to get little help from the "publicity" which flooded my desk at every mail. Most of it was incredibly bad from every newspaper standpoint; the rest had to be rewritten, re-phrased and edited until it could pass muster. And that editing usually meant ten times more work for me than to go out and dig up my own stuff, so I chose the latter course.

But when I refused to run the publicity as it was sent to me what a howl went up from my advertising department! The advertising solicitors pretty nearly wore a path in the hallway coming to my desk to find out why I didn't use some of this Podunk publicity. Didn't I know that the Podunk had just given us a contract for two pages a week? And here I was using a story about the Universal Four which had never given us a line of advertising and leaving out any mention of the Podunk!

Patiently I tried to explain to them that I was trying to run the automobile section from an editorial point of view—for the benefit of my readers, primarily, not for the benefit of someone who had



given us a chunk of advertising. And I tried to show them that those readers were a great deal more likely to be interested in the fact that Jones, who distributed the Universal, had opened a new salesroom and had his new models on display than they were in which Samuel Smith, lord high president of the Podunk company thought about the Einstein theory.

#### "Publicity" Men Not Newspaper Men

I gradually convinced my solicitors and we soon were getting along like members of the same family, but I never could quite convince the advertising men of the factories. Before I had become an automobile editor I had always cherished a rather lurking respect for the automobile publicity men. In the dear, dark days of newspaperdom, a press agent was a sort of super-newspaperman. He was a newspaperman who dug up stories of such interest or so well written that an editor just had to use them, even if he didn't want to do so. In other words, a press agent was a salesman who sold goods—news, in this instance—against the toughest sort of sales resistance.

Now, looking over the publicity I was getting, I began to wonder whether I was losing my mind and losing all sense of news value or whether I hadn't put a little too high a valuation on the automobile publicity man. So I began to make a little investigation.

I tried to find out something about the publicity man. I never could quite seem to locate him. He was in the advertising department somewhere, but I couldn't find him. I met advertising managers, assistant advertising managers, stenographers, bookkeepers, office boys, but I never stumbled on publicity writers. They must have been hidden in the filing cabinets; or perhaps they were too ashamed to admit their identity.

So I began to ask some of the advertising managers about these invisible publicity writers. And then I found out some startling facts. I found that these publicity writers weren't even newspapermen, much less super-newspapermen.

#### Newspapers Themselves at Fault

I discovered that the vast bulk of the newspaper publicity that wasted so many of Uncle Sam's good postage stamps was written by men or boys who had never seen the inside of a newspaper editorial office! The "publicity" end of an advertising agency's business was turned over to some new man in the agency! It was considered "good training" for learning to write advertising publicity! Where publicity came directly from the factory it was written by some eighth or ninth assistant advertising manager who in any other establishment would have been called head office boy!

Imagine this! The work which newspaper men knew required newspapermen of the best kind to handle successfully was being attempted by men who did not even know the rudimentary requirements of their product.

Of course this could not have happened unless it had been encouraged and

I found that certain venal newspapers printed the stuff just because by printing it they could get advertising. Advertising was, in many cases, allotted directly in proportion to the amount of publicity given. And as advertising was what made profits possible and as the papers were going to use a certain amount of automobile news anyway, these papers just shoved in the stuff which was sent them regardless of how terrible it was.

Of course such stuff hurt the reputable papers. When a man is so puffed up when he sees a two column cut of himself in some venal paper that he rewards that paper with a full page paid ad, the reputable paper is going to begin to wonder why it doesn't get some of that advertising. And once it lets down the bars the least bit, it has to keep lowering and lowering them.

I don't want to give the impression that all automobile advertising was handled in that way. But I can safely say that ten years ago seventy-five per cent of it was allotted on the quid pro quo basis of advertising for publicity. And where this system hurt the legitimate newspaper which refused to countenance the publicity "garbage," it hurt the legitimate advertiser who was buying space for its value as an advertisement, not for what he was going to be given in the editorial columns.

#### Hurts Advertisers as Well

This legitimate advertiser was forced to go to the publicity extreme in self-defense, in most instances. I remember one advertising manager who was a real advertiser, not a publicity hound, remarked to me one day.

"I know it's all wrong and eventually it's going to hurt us, but what can I do? If the stuff is going to be given away, I want my share of it. Of course I don't think it does me any good, but some of the directors of my company do, and I've got to get it to please them and to hold my job. It's simply temporary self-preservation with me."

That, I think, summed up the sentiments of the other twenty-five per cent of ten years ago.

The publicity menace began to get so bad that about eight or ten years ago, the Associated Press issued the first pronunciamento on the subject. Thereafter the Associated press would carry no more names of automobiles. In "covering" automobile races, the Associated Press sent, before the race, a list of drivers, cars and number of cars, as, for instance, Gaston Chevrolet, Monroe Car, No. 3. Thereafter in its story of the race, the Associated Press referred only to car number as "Car No. 3, Gaston Chevrolet driving, won the 500-mile race at Indianapolis." Newspapers which wished, might substitute the name of the car for its number.

Then some of the more reputable newspapers began shaking up the postal authorities on the publicity question. Postal regulations are extremely strict in regard to the publication of paid advertising in the form of pure editorial

matter. And some of the newspapers contended that publicity promised in return for advertising was nothing more than paid advertising, a claim which was upheld by the authorities.

#### Improves in Last Decade

But there are more ways than one of skinning a cat, as the postal authorities and the legitimate advertisers discovered. While it may be illegal to promise a certain amount of publicity in exchange for advertising, you can't send an advertising solicitor to jail or hang a fine on a newspaper which simply gives away some publicity. And if the paper gives that publicity to someone who has a prominent ad in the paper—well, of course, coincidences are bound to occur.

That was the state of the automobile advertising-publicity situation when I first came in contact with the automobile industry. Happily it has improved very considerably in the last eight years. Even when I started there were some real press agents among the advertising men. I can remember Ned Jordan, now president of his own automobile company, Harry Ford, later president of the Saxon and Roy VanPatten, president of his own advertising agency in New York, among them, and it is a pleasure to say that when men of this stamp gave me publicity I felt perfectly safe in running it "flat" without even a verification of its facts or even more than a cursory editing.

Nowadays most of the automobile companies are employing good newspaper men to handle their publicity and the effects are being shown. Publicity to-day is about ten per cent in bulk and a million per cent in quality what it was eight years ago. But it has to be that to get by. Newspapers are no longer giving away column after column of automobile publicity. The white paper shortage has taken care of that, even if the newspapers themselves had not learned their lesson and turned over a new leaf.

#### Try to Have Ban Rescinded

This is rather a lengthy dissertation on the automobile publicity situation, but it has its important bearing upon the situation to-day. The advertiser of to-day is suffering for the sins of his predecessors a decade ago. New York is the only city which has taken definite action, but other cities are almost certain to follow suit unless something is done. And that something is to be done by the dealers as well as by the manufacturers.

Organizations vitally interested in the automotive industry are trying to have the New York publishers rescind the action. It was the chief subject of discussion among the advertising managers at their convention in Detroit recently and the advertising managers themselves decided to make an appeal.

But appeals won't do any good unless the automobile men themselves improve their publicity departments. All of the "puff" and "guff" must be banished from automobile publicity. Automobile pub-

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# What You Should Know About Painting Cars

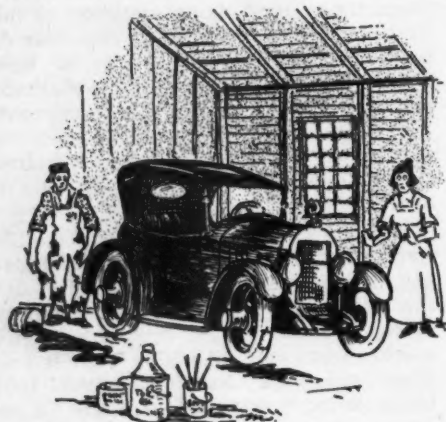
Automobile Painting Is Something the Car Owner Should Not Attempt.  
Rather, the Motor Car Dealer Should Add This To His  
Other Service Work

BY G. KING FRANKLIN

President, Chicago College of Auto Painting, 20 E. Jackson Blvd., Chicago.

THE use of paint for protective and decorative coatings dates back thousands of years. Noah painted the Ark with pitch to protect it, and the use of varnish as a protective coating is of great antiquity. Glue paints applied to the walls of Pompeii are still in existence. Translations of old records depict how women used white lead paint on their faces for adornment—how they removed it the record does not show. The need and use for paint has been magnified a thousandfold to-day; but it is still used as a protective and decorative coating.

A good painter is both scientific and artistic in his work. Scientific in that



Mr. Dubb painted the barn last year, so why shouldn't he be able to paint his car. But the result convinced him that barn painting and car painting are vastly different—

he uses established facts regarding methods and materials. Artistic according to the degree of skill with which he uses these facts. In portrait painting one may be ever so scientific and, lacking skill, produce but a daub. In automobile painting one may be ever so skillful and, lacking facts, produce an unstable job.

Automobile painting to the uninitiated is decidedly simple; to the initiated it is complex to the degree that it must be done in a certain well established manner, and, if good work is the result, there must be no deviation from these rules of procedure. Viewed in the light of a few simple rules, and working with proper materials, automobile painting is easily done, and the finest and most durable finishes result.

It is not to be considered as a plaything for the average car owner who wants to save a few dollars by painting his own, but is to be regarded as a trade or profession to which a dealer or indi-

vidual may profitably devote his time. It is not so simple that one can purchase a can of enamel and do a good job if they know nothing whatever about the work.

We regret to say that some paint manufacturers are none too conscientious. They make up what they call an automobile finish or enamel; their copy writers get up a fine circular extolling its wonderful qualities, and leading the car owner to believe that it is some new kind of a wonder paint which will perform miracles in adding beauty and value to the old car. Mr. Dubb reads this. He has a dark blue car which Mrs. Dubb thinks would look sportier in a red. He buys a can of it. The surfaces on his car are badly cracked, and the varnish is about gone, but there is nothing in the circular or on the can which says that the wonder paint won't take care of everything. Mr. Dubb knows nothing of the work, and has never handled a quick drying varnish. He doesn't look upon the material as a varnish anyway. It's red; that's the chief thing he is interested in.

## Mr. Dubb Paints His Car

He painted the barn last year; has just finished painting the screens, and just knows he can do the same good work on his car. He washes it; stirs up the contents of the can with a twig; resurrects an old brush from the cellar and starts to work. He soon discovers that there is something in the stuff that wasn't in the barn paint. He can't brush it out, and the harder he tries the stickier it gets. Somehow or other he manages to get on a coat of it, but finds that the combination of the red over the blue has produced a dirty purple, and not the color which was in the can. The work is streaked and about as smooth as a cow's tongue. He gives it another coat, and if persevering, another. When he gets all through doing what the copy writer told him to do, he finds that instead of a beautiful car, like the circular showed, he has an unsightly one.

He goes back to the dealer from whom he bought the paint and is told that he didn't put it on right. Of course he didn't, because he didn't know how. Result: Mr. Dubb took his car to the paint shop; the place where it should have gone in the first place. If Mrs. Dubb had been sick he would have called in the doctor. The paint and varnish on his car was "sick" and by the use of the wonder-paint he smothered it to death. There was probably nothing the matter

with the material that Mr. Dubb used—he simply did not know how to do the work. Mr. Dubb now thinks that automobile painting is a very difficult trade to learn. The automobile painter smiles and looks wise.

Barn painting is not the equivalent of house painting. Materials and methods are vastly different. Practically all of the work that the house painter does is protective. He protects the materials being painted, and, incidentally, decorates them. Practically all of the work that the automobile painter does is decorative. He may apply a dozen or so coats of materials to produce a fine, smooth, artistically colored surface, and then protects this surface by means of a single coat of finishing varnish.

In days gone by raw linseed oil was quite extensively used in coach painting. To-day, in automobile painting, it is practically a thing of the past. It was a favorite priming coat in those days, and took only some seven days to dry. Those were the days when they believed that the more material that one got on a surface, the more durable it would be, and twenty or twenty-three coats were commonly applied, and it took all the way up to three months to do the job. To-day it is an accepted fact, that the fewest



—so he took his car where it should have gone in the first place—to the local dealer,—who has a knowledge of the work

coats, consistent with good work, produce the most durable jobs. The very finest of work can be turned out in the small job shop in fifteen days. Factory work is even more rapid, as here they rig up to force-dry the coats, and much of the time spent in drying is saved.

Dealers and garages throughout the country are organized to give the car owners service on every part of his car but the paint and varnish. There are  
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# "IF I EVER RUN A SERVICE STATION"

"If I ever run a service station—" A. C. King used to say this, and a lot of other things, to himself, during the years in which he drove an automobile through several states as the traveling representative of a tire company. King did not hold a very high opinion of some of the roadside service stations, which allowed him to sit in his car anywhere from a minute to fifteen minutes tooting his horn in a demand for oil, gas or tire service. He always thought that some of these service stations were his debtors for time lost to him through inattention and lack of promptness on the part of their employees.

"If I ever run a service station—" King determined in those days that if he ever did, he would run it on the golden rule plan.

King has realized his ambition. He is operating the Central Service Station at Court House Square, Binghamton, N. Y.,



Instant Service has been the keynote of the Central Garage, Binghamton, N. Y., and when you drive up, someone appears immediately to attend your wants

and his motto is Instant Service. King is doing for others what a good many men in the business in which he is now engaged never seemed to think of doing for him, and it is bringing him business and profit.

When you drive up to the Central Service Station for oil or gasoline and even for water or air, which is furnished free of charge, you don't have to blow your horn to get attention, and you don't have

to wait for service. The staff is not a large one, consisting of King, his stenographer and bookkeeper, a head service man and two assistants the year around, with two extra men in summer, but the operating system does away with all delays for customers. King or his stenographer is always stationed in the accessory store, which overlooks the drive-in station for oil and gas service. The minute a car or truck drives up, the person on duty in the store presses a button which rings a

bell in the service station. A service man appears immediately, dropping whatever work he may be doing inside, and attends to the customer's wants. Two gasoline pumps, operated by an electric motor, are in service the year around and during the busy season, two or more wagons give auxiliary gas service at the curb. The main oil station has a gravity feed from barrels located near the roof of the build-

(Concluded on page 53)

"ON THE SQUARE"

GO GO

TO THE

## Central SERVICE Station

A. C. KING, Prop.

WHEN YOU NEED

Gasoline—Oils—Accessories

### Republic-Goodyear-Goodrich Tires

CARS WASHED

Collier and Hawley Streets

Court House Square

## Drive Down Collier St.

To The New

"On The Square"

## Central SERVICE Station

A. C. King, Proprietor

WHEN YOU NEED

GASOLINE OILS ACCESSORIES

REPUBLIC—GOODYEAR—GOODRICH

TIRES

CARS WASHED

Collier and Hawley Streets

The word "service" has always been dominant in Mr. King's advertising. "What the service station man must realize," says King, "is that the demand of the public is not for material but for material with service."







carried by the ticket ever being entered. The ledger account then shows the customer charged with Ticket No. So and So, with the amount. The tickets then are filed numerically in a binder and every ticket the company has had for years will be found in its proper place on the three-foot shelf of records.

The advantage of this record is its simplicity and the fact that it is complete. Whenever there is a question, either at the time of paying an account or later, the ticket on file in the binder is final proof.

Furthermore, with this system of records it is possible within a half hour at any time to foot the cash book and find out just where the company stands. For simplicity, compactness and celerity in handling, the system is admirable and Gage says it meets every need of the business, besides being so economical in operation.

The company is just completing a model garage which will be one of the largest and most attractive in the Sacramento Valley. It is all on one floor and will occupy a succession of rooms for nearly 400 ft. The architecture is perpendicular Gothic and the fronts on two streets are practically of glass. It will afford room for the storage and display of cars, trucks, tractors, implements and accessories, as well as storage bins for a complete supply of parts for all the automotive equipment carried, with all the accessory conveniences of offices, rest rooms and so forth, with shop space amply large enough and well enough equipped to take care of all the work of a Ford agency which has been in business for twelve years, with all the service accumulation that entails.

## Engines Thoroughly Cleaned

Some of the special features of this plant are worth mentioning. One is a large lye tank in which all engines, when it is necessary to lift them out of the chassis and overhaul them, are boiled to remove dirt and grease. When the engine emerges from this tank it goes to the bench so clean as hardly to soil the mechanics' fingers.

The pits in the shop are equipped with running water, electric lights, compartments for tools and each has drain pipes for carrying off the drainings of oil and gas from the cars being worked on. These drippings are conducted through pipes to barrels in the cellar and during the winter the mixture is burned in a special furnace for heating the plant.

The tire rack is a novelty. It is accessible both from the stockroom and salesroom, but tires can be put into it only from the stockroom side. When one is taken down from the salesroom side a trigger latch is released which prevents that tire being put back into the rack. Gage says the psychological effect of this on the salesman is wonderful, as he knows that if he takes a tire down he must sell it.

The company's method of handling used cars also is unique. As a matter of fact no cars are traded in at all. The

[illegible]

The ledger page is just the regular standard ruled ledger loose-leaf, the same size as the cash book. Accounts are opened in it as occasion requires, whenever a sale is made on time or whenever a shop ticket comes in which requires posting. Credits are made in the same way whenever a payment is made on account. The shop ticket shows the parts used on any job together with the shop time. In posting these tickets to the ledger, the serial number of the ticket only is posted, none of the items carried by the ticket ever being entered.

customer who has a car which he wants to trade in on a new one is allowed to place his own valuation on his old car. He is allowed this amount but must give a note for it to the Gage company. The company then takes the old car in and makes an effort to sell it for the amount the customer valued it. If it is so sold the proceeds of the sale credited on the customer's note and the deal is settled. If, however, it is impossible to get as much for the old car as the customer thought he ought to have, a deal is made for as much as the car will bring, the customer is notified and advised to accept it, and if he does, the proceeds again are credited on his note. If any balance remains, he pays it and again the deal is closed.

Gage says this plan has been followed

## SEES NO DROP IN PRICES

Buffalo, June 25—Automobile and accessory manufacturers and dealers must not expect lower prices for many months to come, E. J. McCarthy, president of the American Iron, Steel and Heavy Hardware association said in an address before the National Retail Hardware Deal-

for some years and has worked out very satisfactorily. It has effectively solved the used car problem for the firm and has been uniformly satisfactory to the customers of the house because each has got full value for his car. Of course, it must be evident that this method will apply only to Ford cars.

ers association, which ended its national convention here to-day.

"I believe there will be no fall in prices and no general collapse of business as many fear," Mr. McCarthy said after declaring that the automobile and accessory industry, with an annual product of \$4,000,000,000 was the greatest "finished product" industry in America to-day.

"Iron and steel products and hardware are a tremendous item in the automobile business. Reduced production of coal is cutting seriously into hardware production. There are no large reserve stocks and Europe's demand is heavy despite the exchange situation. The railroads need 800,000 cars and other equipment. They have for the past three years, been buying but 50 per cent of the normal amount of replacement material."



# EDITORIAL

## The Greatness of the Automotive Industry

THE old saw, "Let's trade ideas and we'll each have two ideas," has application even in this modern day. The automotive industry is particularly fortunate as regards the interchange of ideas. The progressiveness of this great institution is due, in a large measure, to the S. A. E.; the industry's clearing house. The automotive industry at this time is making seven league strides. Research work is going on with calm deliberation, and the big problems are the ones being attacked in the research. This was noticeably true at the summer meeting of the S. A. E.

The fuel problem is perhaps the biggest problem confronting the industry today. It was interesting to note that the great majority of reports made at the meeting were pertinent to the subject of fuel.

We cannot help but reap benefits from this meeting of the S. A. E. Our engines will be noticeably improved. Standardization will be carried to greater application, thus helping the service problem.

One important thing that concerns the future of the industry is the assurance that the fuel engineers will be able to cope with the situation, and produce fuel for the next few years of the same consistency that we now obtain. This is highly significant. It means that our engines need only be improved, not changed to meet any outside varying conditions.

Mr. C. F. Kettering once said of the world war that the interchange of knowledge gleaned through the pooling of the nation's wealth of ideas will make it possible to pay the war debt in much less time than had the old time secrecy been maintained. An industry, wherein this interchange of ideas has reached, perhaps, the widest application, is the automotive industry. As proof of this we have but to witness the gigantic strides that have been made in the last ten years. Other industries have stood still comparatively, while the business of the automotive industry has gained not by a few odd per cent but by doubled and tripled output. On the whole, we are particularly fortunate to be connected with such an enterprising business that is now measured as one of the pillars of our nation.

## The Necessity of Fuel Conservation

UNLESS there is a decided change in the fuel situation before very long, we may expect to see fuel conservation measures adopted, at least in some localities. When it becomes known that in the first four months of this year we used up

more gasoline than we produced, the seriousness of the situation will at once become apparent.

The truth of the matter is that we have drawn on our fuel supply without giving much thought to future conditions. All the while the production of automotive apparatus has increased, to say nothing of the many concerns who have established oil burning furnaces in place of the former coal burning installations.

Automotive engineers are giving much thought at the present time to the fuel question. The result is that we are beginning to see hot-spots, manifold, carbureters; in fact, a large variety of devices all brought out with the prime idea of getting more out of the fuel. This is one of the first steps in the matter of fuel conservation.

But, the conservation of fuel does not rest with the engineers. There is no telling as to the amount of gasoline wasted every day in this country through the hands of users of automotive apparatus and in dealers' service stations. Probably eight out of ten carbureters are running on too rich a mixture. This is a loss. Car owners are not always careful in ascertaining the amount of fuel left in the tank when buying additional gasoline, with the result that the tank fills too soon and there is an overflow. Another loss.

Motor car dealers would be doing a great work could they get the owners of cars to periodically come into the service station and have carbureters looked after, joints tightened, valves checked up, ignition looked after and several other things that collectively would make better running and more efficient engines, with a resultant saving in fuel.

Gasoline is used throughout the automotive world for washing parts, a practice that if it could be stopped would net the United States something like \$100,000 a day in the amount of fuel saved. Along these lines it is well to note that some concerns are bringing cleaning compounds on the market designed to do the work of gasoline. This is a practice to be recommended. Not only do these compounds do the work fully as efficient as gasoline, but there is the additional advantage of conserving the latter. These preparations when sold in liquid form cost as low as eight cents a gallon, as against thirty or more for gasoline.

If the users of automotive apparatus and those taking care of the repairing of it will co-operate with the engineers who earnestly are endeavoring to design and build engines and vehicles to get more out of a gallon of fuel, there is every likelihood that the fuel situation will become materially relieved.

## Publicity and the Dealer

ELSEWHERE in this issue of MOTOR AGE appears the first of two articles on automobile publicity. These articles were written by a member of the MOTOR AGE editorial staff who, before he became associated with this company, had spent ten years as the Automobile Editor of one of the largest papers in the United States. He gives the viewpoint of the newspaper man, therefore, on the publicity question, and this viewpoint should be important to dealers and factories alike, for if you are going to "sell" publicity, it is important for you to know the psychology of the man you are selling to.

It may be objected that this week's article is merely destructive; that it is just picking the flaws in present-day publicity. That may be admitted. If it were to be the only article, it would not be published. but it is to be followed next week by an article along constructive lines, and the destruction this week is merely clearing the way for the construction to come.



## All Divisions of Industry Interested in Bank Credits

See Many Companies Forced Out of  
Production Unless Present  
Strain Is Removed

NEW YORK, June 25—All the financial interests in New York which are representative of the automotive industry have taken up seriously the questions of bank credits. In the first place they seek to benefit the industry as a whole and in the second place they seek to protect themselves. Credit is becoming every day a more serious question.

The propaganda which has been carried on to make the banks and other financial interests feel that passenger cars are non-essentials and therefore luxuries, is bearing fruit. It has reached a point now where some of the smaller companies may have to go out of production unless there is an easing of the strain. Although they may be on the soundest basis they are bedeviled by the banks and by merchandise creditors.

The parts makers from whom the manufacturer buys have a credit problem of their own, and they are trying to meet it in a sane and broad-minded way. They must protect their own interests but many of them are coming to feel they must grant more liberal credit to customers who are good risks and who always have paid their bills promptly in the past.

Automotive interests have determined to convince their individual members that automobiles are essential and that it is dangerous to curb another element of transportation when transportation never was so much needed as now. They believe that if individual bankers here and there can be shown the essentiality of the industry the facts of the case gradually will percolate through the entire financial structure.

Financing companies are having their own troubles. Many of them have had their own lines of credit curtailed and therefore, at a time when the demands of dealers are heavier than usual, they are able to give less accommodation. To extend their lines to new banks they are selling the industry to bankers.

Many dealers have grievances, real or fancied, against finance companies, but the finance companies have a grievance against certain dealers whom they accuse of unscrupulous business practices. As a consequence their credit men recently have organized the Automobile Credit Men's Financing Association, Inc. This organization has established a clearing house for the protection of the members.

One of the evils cited by finance companies is that certain dealers induce car purchasers, ignorant of business practices, to sign two or three notes. These notes are then taken to two or three different finance companies and money obtained on them from each. A record of every piece of paper bought is filed at the clearing house and these cards are

scrutinized carefully. This is expected to put a crimp in the dealers who have been guilty of unethical practices and thereby conserve credit.

The finance companies are not pleased with the attitude assumed by many banks. They contend, for example, that the note of a reputable automobile dealer is vastly better security than a trade acceptance. They point out that in many cases it is backed or endorsed by the manufacturer. It also bears the endorsement of the dealer himself and the finance company. When it goes through a bank of deposit it has that bank back of it, and still Federal Reserve banks are refusing to rediscount this paper although all of it is secured in the last analysis by the commodity sold.

## WANT TRUCK LAW CONSTRUCTION

St. Louis, June 25—Commercial Car Bureau of the St. Louis Automobile Manufacturers and Dealers' association has appointed a committee to work with Illinois officials to obtain an accurate construction of the law in that state to regulate motor truck loads and tires. The committee follows: H. H. Hawke, general sales manager, Traffic Motor Truck Corp.; B. A. Purcell, Dorris Motor Car Co.; C. A. Bothell, Packard Motor Car Co., and Robert Prout, Western Automobile Co., who will confer with Attorney General Brundage.

Raymond A. Walsh, manager of the Federated Roads Association of Missouri, announced that motor truck tours of the state would be made as a means of boosting the campaign for a \$60,000,000 road bond issue to be voted on in November. The tours will begin in August and will last six weeks. A tour to start from St. Louis will cover the southern part of the state, and another from Kansas City will cover the northern part of the state.

## OPEN NEW STUDEBAKER PLANT

South Bend, Ind., June 25—To-day will be a holiday for 7000 Studebaker employees here, the occasion being the official opening of the new \$20,000,000 plants of the corporation in this city in which the Studebaker Light-Six will be produced complete. The opening will be celebrated at the plants, on the streets of the city and at an amusement park. The festivities will begin with a parade of Studebaker officials and employees, headed by the 100-piece Studebaker band and other bands which have been engaged for the occasion. At the park the employees and their families will participate in field day stunts and events, a circus and a barbecue. In the evening the corporation will give a banquet in the dining room of the new plant which will be attended by men in automotive and financial circles and representatives of the automotive press.

## HEADS HARE'S PUBLICITY

New York, June 26—Henry Caldwell has been appointed publicity director for Hare's Motors, Inc. Mr. Caldwell was formerly automobile editor for the New York Tribune and the New York Herald.

## Member Banks Refuse to Tighten Motor Car Credits

Results of Federal Reserve Board's  
Advice Have Been Practically  
Negligible, Report Shows

WASHINGTON, June 25—Discrimination against automobile paper up for rediscount at Federal Reserve banks has netted little or nothing in the results anticipated when member banks were advised to tighten credits. The report of the board for June issued to-day shows clearly that their efforts to discourage rediscounting automobile and other classes of commercial paper has failed to affect any material changes in the financial situation.

Whatever success that has greeted their plan was reported in the large cities where the larger banks are naturally impressed with the necessity of greater care in controlling their obligations. This curtailment has in nowise checked the growth of demand for bank accommodations for commercial transactions. It is not surprising to the nation's financiers that the constantly increasing demand would inevitably operate to raise the rates of interest. With the tendency for still higher rates commercial paper has brought of late  $7\frac{1}{2}$  to 8 per cent. High rates count but little these days for the board has found that the funds realized from the reduction of speculative commitments has been absorbed by applications for commercial uses.

It is of particular import to the dealers in the South and West to note the gradual transfer of Federal Reserve resources from northern and eastern districts to their territory for the purpose of facilitating the movement of crops to market. Railroads have been unable to meet the demand for transportation. The rapid growth of the motor truck for relief in congestion is expected to influence banks in extension of loans to farmers for the purchase of equipment.

## LAKE SHIPMENTS AID DRIVEAWAYS

Minneapolis, June 25—The deadlock in freight car transportation of automobiles that are routed through Chicago or Milwaukee has been broken to some extent by boat route to Duluth and driveaways from that city to destinations in southern Minnesota and the Dakotas. This is in addition to the operation by the Pence Automobile Co. of two freight trains which the Pence Automobile Co. owns and operates to the Buick and G. M. C. factories.

Three boat shipments have been received by the Pence company and the Twin City Motor Car Co. The latter has received and driven away 110 Hudson and Essex cars and the Pence Co. 240 Buicks. The latter companies received four trainloads of fifty-five cars, each carrying automobiles. The Carlson Motor Co. of Duluth has received three shipments by boats.

## No Letup in Tightness of Freight Situation

### Movement of Crops Is Expected to Prolong Stringency For An Indefinite Period

NEW YORK, June 25—No improvement is apparent in the transportation situation so far as it relates to the shipment of automobiles, at least. There has been a slight easing, however, in the strain of getting supplies to factories although there is no possibility of accumulating a reserve stock of materials to tide manufacturers over the fall when crop shipments are in full swing.

Lack of transportation is the most alarming phase of the present industrial problem. It is more serious than the credit tension upon which it has had an important bearing. There is no prospect of material relief. The accumulation of freight cars has been cut in half since the Interstate Commerce Commission began untangling the jam on the railroads but the equipment is being devoted to the movement of the new crops. In this connection not more than half the old crop of wheat in Kansas has been taken out of the elevators and warehouses and the new harvest is only a few days away. It already is under way in some of the great wheat growing sections.

The Interstate Commerce Commission has taken up the representations made by the National Automobile Chamber of Commerce in reference to the shortage of automobile cars. It was pointed out that instructions regarding the movement of this type of equipment has not brought results and that the refusal of other equipment for the shipment of automobiles, therefore, is unfair. The commission has been informed that automobile manufacturers drove away from their factories in April the equivalent of 17,000 freight car loads of automobiles and that they are adopting every possible expedient to relieve the carriers and thus aid other shippers.

Refusal to supply open cars is having a serious effect on the shipment of motor cars for export and this situation has been called particularly to the attention of the commission. Every effort will be made to gain better recognition of the automobile car and the reasonable use of open cars.

Another menacing problem which confronts not only automobile makers but manufacturers in every line is an impending coal shortage. Reserve stocks are exhausted and many factories are already running on a hand to mouth basis. Conditions are similar to those which usually prevail in the middle of the winter. Dealers, with the books filled with orders, are unable to make deliveries.

### NO ROAD PARKING IN DELAWARE

Wilmington, Del., June 25—So annoying has become the practice of spooners parking their cars, late at night, along

the country roads, near Wilmington, that the county commissioners of New Castle county have appointed two special policemen to take their license numbers and follow this up with such action as seems warranted. Many of the residents claim that they are kept awake at night by persons who engage in this practice.

### BARS PAN ADVERTISING

Washington, June 25—Orders were issued to-day by the Federal Trade Commission against Samuel C. Pandolfo and the Pan Motor Co. of St. Cloud, Minn., prohibiting the publication of false statements on production, financial condition and endorsements. Pandolfo was the organizer and late president and fiscal agent of the company. Following the investigation instituted at the request of the Capital Issues Committee of the Treasury Department, his resignation was demanded and received.

## Automobiles Make Detroit Fourth Largest U. S. City

### Census Figures Show City of the Straits Has Passed Many Rivals In Last Decade

DETROIT, June 24—Tribute to the automobile industry as the foundation for the extraordinary growth of Detroit is given by the press throughout the country as a result of the publication of census figures showing this city in fourth place, with a total of 996,796 inhabitants, a gain of more than 131 per cent. That the phenomenal spurt has been due solely to the influence of the automobile is conceded and the figures furnish elaborate testimonial to the motor vehicle as a necessity in the life of the nation.

For years rumors of Detroit's growth have filtered through the newspapers to all parts of the country but to most persons they were regarded strictly as rumors and were given scant attention. That the influence of the automotive industry could be felt so strongly was incredible in the minds of most persons and it remained for the government census to awaken them to a realization of the true situation. Detroit ten years ago was beginning to climb as a result of the influence of the automobile and truck factories and the allied industries but the growth from the day Henry Ford opened his factory until 1910 was as nothing compared to the continued and rapid increase since that date.

The city's chief claim to distinction before the advent of the motor vehicle was as a stove building center but to-day no one thinks of Detroit save as the home of the automobile. With twenty-four automobile factories in Detroit and nearby towns in production, two others about to start and eighteen truck factories turning out trucks in varying sizes the laymen may grasp some idea of the influence wielded.

## Wilmington Garages Now Operating on Sufferance

### Supreme Court Holding City Ordinance Valid Puts Repair Shops In Precarious Position

WILMINGTON, DEL., June 25—As a result of a decision just handed down by the Supreme Court of Delaware, hundreds of public garages in Wilmington exist in violation of law and their continued existence is at the mercy of owners of adjoining property.

Some years ago, by virtue of its general powers, the City Council of Wilmington enacted an ordinance prohibiting the erection of any public garage within forty feet of the building line of a neighboring property owner without the consent of the latter. In this category, according to the legal construction placed on the ordinance, are all sorts of garages where one or more spaces are hired out or where work is done on cars other than those owned by the proprietor of the garage.

Notwithstanding the ordinance, about a year ago Augustino Fortunato began the construction of seven public garages in a built-up section of the city. He did not first have the consent of neighbors and three of them brought action in the Court of Chancery to restrain him from building. The case was made a test of the ordinance, and as Chancellor Charles M. Curtis decided that the ordinance was invalid and dismissed the temporary injunction that had been issued. Fortunato proceeded with the operation and it was soon completed and the garages have been in use for some time.

Other persons, who had been holding off because of the ordinance, followed Fortunato's example, after the decision had been handed down, and general construction work of that character was soon under way. The result, according to Building Inspector Ellis P. Preston, is that several hundred such garages have been built since the chancellor ruled that the ordinance was invalid.

The protestants in the Fortunato case took the matter to the Supreme Court, however, and the latter tribunal, which is the court of last resort, has reversed the chancellor and decided that the ordinance is valid and that Fortunato proceeded in violation thereof.

### MOTOR MAKER OUT ON BONDS

Dallas, Tex., June 26—William S. Livezey, former president of the Little Motor Kar Co., has been released on \$21,000 bonds after having spent several weeks in the county jail where he was lodged on charges of embezzlement and misuse of the mails. A bond of \$15,000 was required by federal authorities and \$6,000 by the county authorities. Livezey and other officials of the company, which has gone into receivership, are scheduled to face trial in the federal court here next week.



## New Orleans Dealers to Fight Inimical Legislation

### Bills Introduced Which Would Harm Industry to Meet With Organ- ized Opposition

NEW ORLEANS, LA., June 25—New Orleans dealers in automotive vehicles of all kinds are taking the lead in a campaign to be conducted by every dealer in Louisiana against a bill which has been introduced in the present session of the legislature by Wallace A. Nunez, of St. Bernard Parish, barring motor trucks of more than four tons capacity off every highway and street in the state, and, as well, prohibiting the use of trucks and trailers with steel tires.

The Louisiana-Mississippi Automotive Trades association is handling the plans for the campaign and three meetings have been held within the past few days preparatory to carrying the battle to the state legislature in Baton Rouge. Mr. Nunez' bill has been rushed through its second reading and the fight against it must be made at the third meeting, or else left for the courts after the bill is passed.

The great support for the bill comes from two sources: The railroads and their lobbyists, which and who are anxious to kill every attempt to make truck transportation a success, and from the police juries (corresponding to county boards of supervisors in other states) of the various parishes, who claim that the use of heavier trucks destroys their roads. The answer to this latter claim, of course, is that if the roads were properly built, all-the-year-round highways, they would not be destroyed by any kind of hauling over them, but this argument seems never to have been presented to the police juries.

It is interesting to note that the men who helped Mr. Nunez draw up this bill are the attorneys for two of the railroads which, before the war, were most active in their efforts to delay the improvement of Louisiana highways and inland waterways, and that the chief lobbyist for the present bill at Baton Rouge, is also attorney for the largest and longest railroad which enters New Orleans. The automobile dealers of New Orleans and the remainder of the state, realizing that they have a stiff fight on hand, have made no statement, nor will they make public their plan of campaign, but they have retained able attorneys, and have subscribed heavily to funds to pay the expenses of experts to appear before the legislative committees of both houses on this bill and to fight it before the general sessions of the legislature.

### ITALIAN INVENTS NEW ENGINE

Washington, June 25—Consul General Wilbur has forwarded to the Department of Commerce a description of a new engine recently invented by an Italian engineer, Severe Campofregoso. According to the advices received from Genoa, Italy,

to-day, the engine has been patented in this country and abroad. The claim is made that British engineers seek control of the patent rights in all countries.

According to the consul general's report, the principal advantages which are claimed for the Campofregoso engine are complete absence of valves and cam axis; power four times greater than that of the engines now in use; absence of vibration; abolition of internal strains and reduction of attrition; economy in fuel; simplicity, rapidity and low cost of construction.

### TRACTOR REPAIRS BY PLANE

Charles City, Iowa, June 26—The Hart-Parr company has a dealer, J. W. Pokorny, in Valparaiso, Neb., who believes in being strictly up-to-date in rendering service to the customers in his territory. He has purchased an aeroplane and when a farmer calls up asking for a part on a Hart-Parr tractor he gets it to him in double-quick time. He recently took a part twelve miles from his place of business and delivered it in eighteen minutes from the time he received the call.

## Car Thefts Cost Los Angeles \$6,714,980 in Five Years

### Big Total Is Based on Comparatively Low Average Valuation for Machines Stolen

LOS ANGELES, June 28—What Los Angeles motorists have suffered from the activities of motor thieves was revealed by a compilation of the records for the last five years. The Automobile Club of Southern California maintains an anti-theft bureau and keeps accurate check on data of this nature. According to these reports there have been 8,189 cars stolen in this vicinity since 1915. These represent an approximate total valuation of \$6,714,980, according to the authorities.

This staggering total is based accurately on an average valuation of \$820 for each car, which is a low figure, considering the fact that expensive cars have been the chief prey of thieves since this type of stealing was put upon a commercial basis. The thieves get away each year with an average of 1657 cars. In 1919 there were 1662 taken. To date, during 1920, there have been 593 cars reported to the authorities as stolen and of these 492 have been recovered and returned to their legal owners.

It is pointed out the leniency of the courts in putting motor car thieves on probation is the ban of the authorities in contending against the theft evil. The short term sentences that usually are imposed, when the culprit is not permitted his freedom with a warning, usually result in the offender being sent to prison where he learns from associates more advanced methods for this sort of crime. The authorities estimate that about four-fifths of the cars stolen are recovered ultimately, but almost always they are in a damaged condition or are stripped of tires and other accessories.

## Peoria Commercial Car Dealers Stage Truck Demonstration

### Outgrowth of "Ship-By-Truck" Parade Delivers Gratifying Results

PEORIA, ILL., June 25—Twenty truck dealers of this city, assisted by the Chamber of Commerce, have just completed a very successful "Ship by Truck" campaign. Starting with a parade of 100 trucks through the streets of Peoria on May 22, the dealers arranged a sectional run to towns and villages of the county. Four of these rural trips were arranged a week apart and each covering a different route. Wholesale firms of Peoria were invited to furnish loads for the various suburban places visited and the hauls were made without charge while in some instances, return loads were handled, also without cost to the consignee. The object of the various demonstrations was to arouse interest in trucks and especially to inaugurate truck lines carrying the products of Peoria to the outlying towns of the county.

Each truck participating in the tours, was decorated with the name and business location of the dealer handling them, while paramount on every truck, was the slogan "Ship by Truck." Speakers accompanied the party and gave talks at each place, telling of the advantages of truck service and suggesting the inauguration of a line by the co-operation of the business men with the wholesale firms of Peoria.

### Cheaper Transportation Shown

It was argued that daily service could be arranged, all products be handled much more expeditiously than by the steam lines, while a saving in the cost of transportation could also be effected. Figures were presented, showing the difference in the cost. So convincing were these arguments that numerous truck lines have been inaugurated for testing purposes and, if the business men in the smaller towns are convinced that the claims of the truck representatives are true, there is every reason to believe that the service will be permanent.

The dealers here are well satisfied with the success of their demonstration and believe that it has brought profitable returns and that many sales of trucks can be traced to it. They are planning another of the same kind in the fall and will make a special effort to interest the farmers. The men who till the soil in this section, are chary about adding trucks to their farm equipment and remain loyal to horses for hauling purposes. All own automobiles and many have bought tractors, but the average farmer is dubious about a truck. The dealers here believe that the farmer is in a receptive mood, however, and that the right kind of a demonstration will have the hoped for results. The next series of runs will be aimed directly at the agriculturists.

## No Relief for Gasoline Shortage in Oregon Before End of Month

PORTLAND, Ore., June 24—With little prospect of relief before the end of June, and only partial relief then, the whole of Oregon is to-day suffering from a drouth of gasoline. So acute has the shortage become that in some parts of the state business is paralyzed and food production is threatened. Operation of passenger cars either has been stopped entirely, or in the more fortunate communities reduced to a minimum by rigid rationing of motor fuel in one or two-gallon lots.

In many towns it is to-day impossible for love or money to procure gasoline for passenger car use. Dealers and garages are on ten-gallon daily allotments or none at all.

In one town, Astoria, the second largest city of the state, the city government has taken over all gasoline supplies and is now apportioning the small amount on hand to fishing boats and trucks operating in essential industries. No gasoline at all is delivered to filling stations. The only passenger car owners permitted to have any gasoline during the shortage are doctors, and they are limited to five gallons per week. In this town the rationing applies to kerosene as well as to gasoline.

Similar conditions exist elsewhere, particularly in the agricultural communities, the available gasoline being doled out to trucks and farmers in small quantities for use with tractors.

In Portland, while the situation is not quite so desperate, strict rationing measures have been imposed. Commercial cars are permitted only 75 per cent of tank capacity and passenger cars are held to 10 per cent of tank capacity. There is a possibility that even more rigid rationing will be resorted to, possibly on a gasoline card basis.

Representatives of the Standard, Associated, Shell and Union Oil companies, at a conference with Mayor Baker and members of the Dealers Motor Car association of Oregon and the Portland Garage and Repairmen's association, agreed to this program as the only means of weathering the shortage without stopping industry.

It would be possible in Portland to allow somewhat larger gasoline rations, but in view of the fact that the Mystic Shrine is to hold its annual convention here from June 21 to 23, all these interests agreed to doubly strict regulations for passenger cars to save gasoline for Shrine week, when the bars will be temporarily lifted. But even after that the oil companies are not promising more than a 50 per cent supply for possibly all of July.

There is a gasoline shortage all along the Pacific Coast, but it has hit harder in Oregon than elsewhere. One reason for this probably is the state law requiring that gasoline sold in Oregon must be of 56 specific gravity. However, sev-

eral weeks ago when a shortage was impending and the oil companies declared this law to be the cause, in response to demands from all over the state Gov. Olcott suspended the law.

The Governor announced that he had no authority to suspend the law, but that in view of the emergency he agreed in writing to pardon any person who might be prosecuted and convicted for violating it by selling gasoline of less than the required gravity. This was expected to remedy matters. But instead, the shortage has become steadily worse.

The cause of this coast wide shortage is difficult to get at. The oil companies declare it is due to shortage of production in the California fields, but that within ten weeks a new method of "cracking up" crude oil to obtain a larger percentage of gasoline from it, will be in operation and that the shortage will then be relieved. All declare that it is a temporary condition, and they are going ahead in Portland on the construction of many new filling stations.

Some dealers and motorists have been inclined to scent a plot to increase gasoline prices. However, in justice to the oil companies it must be said that when the Governor announced suspension of the specific gravity law, the Standard and Union companies promptly reduced their prices from 27 cents per gallon to 25½ cents per gallon. The Shell and

Associated companies have now followed suit.

Naturally, the gasoline shortage has very seriously affected business of motor car dealers and garages. This is especially so in the smaller towns, where the situation has been further complicated by coming at the very time when bankers were curtailing credits generally and on automobile paper specifically. Many country dealers have canceled their allotments of cars until the shortage is over.

This, of course, is throwing many cars back on distributors in Portland. However, the first panicky feeling among motorists and prospective buyers when rationing was first ordered seems to be passing away. There was a decided slump in business for a few days, but it now seems to be generally accepted that the shortage is but temporary and cars are being accepted by buyers. New orders also are improving.

### MOTORIZE MORE STATE TROOPS

Washington, June 26—Army motor transportation will replace the horse-drawn vehicles of the sixteen National Guard infantry divisions and two cavalry divisions. Orders were issued today to the Motor Transport Corps to furnish these militia organizations with motor equipment. The list which has been submitted to the Chief of the Militia Bureau for approval includes 4,976 motor vehicles, 1,280 bicycles and 1,060 trailers. It is believed that this list will be supplemented by loans of equipment from the regular army during the training season of the state military units.

## Three Bills Introduced in Louisiana Seek to Solve Gasoline Problems

BATON ROUGE, LA., June 25—Three bills of great importance to the oil industry and to the production of gasoline, kerosene and lubricating oils not only in Louisiana, but in the entire field fed by the wells of Louisiana, are the storm centers of long hearings before special committees of the legislature, and probably will so continue for two or three weeks before they are reported back to the lower house or senate.

These bills are:

1. Providing that all oil pipe lines within the state shall be made common carriers.
2. Providing that a company owning a pipe line in a field where more oil is produced than the pipe line can carry, shall not send more of its own oil through its own pipe line than of the oil produced by companies not owning pipe lines.
3. That companies owning oil wells and pipe lines must organize entirely separate companies to operate and own the pipe lines.

These bills were aimed, primarily, at the Standard Oil Co., which, by claiming that its pipe lines are part of its refinery equipment, has been able to handle

only its own oil, to the exclusion of the oil of a number of independent producers, and has so forced these small producers to sell out to it at prices alleged to have been much below the market value of the lands and wells. The pipe lines, being made common carriers by these bills, and operated by separate companies from those operating wells and refineries, would come under the jurisdiction of the State Railroad Commission.

It was expected at the introduction of these bills that all the independent oil producers would support them, though a stiff fight was expected from the Standard Oil Co. of Louisiana. Much to the surprise of the legislators, and especially to that of the senators who introduced the bills, however, the independents lined up with the Standard in their opposition, when the joint legislative committee commenced its hearings on the measures. In fact, the independents were even more aggressive opponents of the proposed laws than the agents of the Standard Oil Co. Some few of the independent operators endorsed the measures, but the majority lined up solidly with the Standard and Judge R. M. Milling, of Shreveport, representing the op-



posing independents, declared at the hearing:

"We are not in any way affiliated or connected with the Standard Oil Co., but we are here to oppose the most drastically unjust legislation ever proposed in Louisiana."

#### TWIN CITIES BUS MEN TO STRIKE

Minneapolis, June 26—Trainmen of the Twin City Rapid Transit Co., operating trolley cars in Minneapolis, St. Paul and suburbs, will strike July 1 unless wage increase demands are granted. The company announces it cannot meet these demands unless a seven-cent fare is granted in the cities, which now is five cents.

Motor bus companies were preparing, along with taxicab companies, to do a big business after the strike, which will tie up all electric car transportation. Now the drivers of the Twin City Motor Bus Co., which operates between the twin cities at twenty-five cents fare, announce they will strike July 1 unless they get the raise they demand, which is a guarantee of \$4.50 a day and a percentage commission. They are getting now a guarantee of \$3.50 a day and a commission of five cents on all fares above 135. The bus company officials say these average earnings are about \$35 a week, although occasionally the amount reached is \$60.

The only other buses available are those operating suburban lines out of the cities and buses recently discarded by the Minneapolis Street Railway Co., which had been operated to take the place of electric lines now being built in the city. Garage owners and taxicab companies will meet soon to arrange to take care of the people in case the strike materializes, by operating jitney buses.

## Indiana Legislature to Take Up Bills Affecting Road Construction

INDIANAPOLIS, June 25—The special session of the legislature to be called next week by Governor Goodrich, to pass certain emergency legislation, will consider laws effecting the roads of Indiana.

At this special session the state highway commission will make an effort to obtain at least a 10-cent levy. At the 1919 session the commission was granted a 10-cent levy, but in the operation of the tax law the levy was cut in proportion to the increase in the assessment. This reduced the highway levy to 5.9 cents, thus not providing funds for the development of the road system in Indiana. It is the contention of the commission that the commission should have this 10-cent levy if the right road building is to be done.

The legislature will also be asked to correct certain evils in the county unit road law, to facilitate local road building. To stimulate buying of road bonds, the legislature will be asked to increase in-

## Little Rhody Comes in With a Great Road Building Programme

PROVIDENCE, R. I., June 24—Joining in the vast campaign of highway building now sweeping over the country, Rhode Island comes into line with road projects far exceeding in magnitude anything ever before attempted here. The State is in the midst of a "Federal aid" programme of twelve immense numbers and \$1,281,942.36 expenditure. It is also on the second portion of a three-year "highway act," which gives \$250,000 annually, and still there is left the item of maintenance revenues of the department of the State Board, bringing in, by estimate, \$742,000.

If men, teams and machinery could be assembled in sufficient numbers, and shipments of material could be realized to accomplish it all, the sum total of all this could be put upon the highways of the State in these programmes is about \$2,500,000.

In actual results, the work expected to be done this season, according to State Engineer Irving W. Patterson, will probably be in the neighborhood of \$500,000, this figure being much beyond what has been laid out in any year before. It should be remembered of course that cities and towns will expend local money in amounts that would roll up a very considerable total if they could be put together.

Nine big State highway undertakings are under construction at the present time. These, when completed, will add about twenty-three miles of macadam to the mileage in the State. The importance of this is enhanced, however, by the fact that the pieces of road being built are intended to fill up "gaps" in

already existing lines, so that the completion of even a short stretch may mean opening up a new thoroughfare to touring or motor freighting service. This phase is especially important since the cost of building such roads as are now necessary to support the heavy traffic put upon them, rises often as high as \$55,000 a mile. When this summer's new road map is completed the connecting links will add substantially to the through lines which indicate the best touring roads of the State.

Activities of the season have opened up at an earlier date than usual, and there is the prospect that gratifying results can be attained as difficulties in obtaining labor and materials are sometimes neutralized by the use of new machinery.

The Federal aid projects, in which the State benefits, are those undertakings in which the Government pays half the bill. Twelve of these have been laid in the State. Two are completed, five are under construction, three have progressed as far as the filing of detailed statements in Washington and two are still in the hands of the engineers at the State House, who are making out detailed plans.

Among the projects are the reconstruction of Post road from Wakefield to Matunuck, on which work was completed last season and eliminates many corners and turns; doing away with "outrageous alignment" of the Boston Neck or Narragansett Pier road at Saunderson; the building of 1.15 miles of the Pier road in the town of Narragansett, now completed; the building of five miles of the Post road in Westerly and Charlestown on which work is to be completed Oct. 1; making a fresh foundation for macadam of New London avenue in the town of West Warwick and the city of Cranston; fixing up two sections of Putnam pike west of Chepachet, where there are unusual problems due to clayey subsoil and loam pockets; a piece 2.6 miles in length in the town of Middletown.

This completes the list of projects that have been begun or which will probably be done this year.

#### TWIN CITY DEALERS HAVE OUTING

Minneapolis, June 25—The Minnesota State Automobile association held its annual outing June 23, when the tour started for Duluth. About 100 cars were expected to make the trip. The first night stop was Moose Lake, the second at Duluth, where the tourists were entertained with short runs to Two Harbors and other towns on the Iron Range. Others will go on to Grand Marais on the north shore of Lake Superior. The pathfinder car has started from Minneapolis. The Duluth Automobile club has signed contracts for marking the six main highways out of that city. Return will be made at will by the tourists.

#### BOSTON DEALERS HAVE OUTING

Rye Beach, N. H., June 27—Rain seemed to give added zest to the outing of the Bay State A. A. of Boston at the Hotel Farragut. All day the members and their families and friends competed in sports with no regard for the weather.

Prizes worth more than \$1000 were distributed. In the big event, the golf tournament John H. Johnson won the silver cup for the member's best net score, with a 74. He did 92, which, with his handicap of 18, gave him first. Joseph S. Donovan was second with 75, a gross of 91, and a handicap of 16. John H. MacAlman, with a 20 handicap, was third with 79.

The best member's gross was won by W. Oulmet, with an 87 and a handicap of 12, giving him 75, and Albion L. Danforth, with 93 gross, 12 handicap, giving him 81.

## Indiana Plans Road Work of \$30,000,000 for Year

### State Highway Department Outlines Construction Program to Pave 500 Miles of Thoroughfare

INDIANAPOLIS, June 26—A 1921 state highway program to cost between \$26,000,000 and \$30,000,000 is contemplated by the Indiana state highway commission according to L. H. Wright, director of the department. This program is contemplated despite the feeling in some influential quarters that because of the high cost of material and other conditions this is no time to plunge so heavily into this form of public improvement.

The huge sum will provide for the paving of approximately 500 miles of roads, the building of many bridges, the maintenance of approximately 3,500 miles of roads in the state highway system and the overhead of the department, Mr. Wright estimates.

The commission's bill, now being prepared for the special session of the legislature, will ask for a state highway levy of 30 cents on each \$100 of assessed valuation in the state. Mr. Wright estimates that on the anticipated \$6,000,000,000 state total assessed valuation of this year the levy would produce \$18,000,000 revenue for the department.

He estimated that to the direct tax would be added \$5,000,000 the maximum amount the department may obtain from the federal government for road building next year. From the inheritance tax \$500,000 is anticipated and the automobile license department will add at least \$2,500,000 according to present estimates.

The total thus available for the department next year would be \$26,000,000. This may be increased \$2,500,000 by the proposed doubling of the state automobile license fees, but Mr. Wright said, the state highway commission does not propose to ask the legislature to double the fees, although, he said, such a bill may be introduced at the special session by others.

### GIVES CREDIT ON TRACTORS

Oklahoma City, June 25—Bankable notes issued by farmers and secured by mortgages on motor trucks or tractors will be accepted for rediscount of the Kansas City Federal Reserve bank, according to a telegram received here by the Butler-Williams-Wakefield Motor Co. from the bank in regard to an inquiry it made on the subject. The bank's telegram said:

"While it is inconsistent with the policy of our executive committee to pass on any particular note until offered, paper given for farmers' trucks, tractors and implements is technically eligible, and when properly prepared, presented and endorsed by a member of the bank, will be discounted if it otherwise complies with provisions of the Federal Reserve bank and regulations pertaining to agricultural paper."

A banker at Blackwell, Okla., had called a farmer's attention to the fact that notes secured by mortgages on automobiles were not accepted for rediscount by the Kansas City bank and expressed the opinion that the inhibition extended to notes secured by trucks. When the Butler-Williams-Wakefield company heard of this incident it sent its telegram.

(This explanation of the position of the Kansas City bank is expected to clear up a situation which has caused some concern among bankers and dealers. Banks other than the one in Oklahoma evidently were laboring under the same misapprehension for reports from Kansas City have been that banks were refusing to accept paper covering not only trucks but tractors which have been accepted as an absolute essential for increased farm production.)

### ENFORCE NEW YORK TRUCK LAWS

Buffalo, June 26—State Highway Commissioner F. S. Green has given orders for strict enforcement of a section of the highway law relating to truck operation. This section provides:

No truck with load shall weigh more than 25,000 lbs.

No truck body including load shall be more than eight feet wide.

No truck body including load shall be more than twelve feet six inches long.

No wheel shall carry more than eight hundred pounds per inch width of tire.

State police have been directed to enforce this section.

### POSTPONE MILWAUKEE TRUCK BAN

Milwaukee, Wis., June 28—Action on amendments to the proposed ordinance governing motor truck traffic in the city of Milwaukee has been deferred until early in July by the judiciary committee of the common council. This was done largely because a delay might permit of valuable information arising out of the proposition of a national law which is to come up at the convention of the National Transportation association in Chicago June 26 to 30.

Features of the proposed ordinance embrace speedometers on all trucks, the regulation of governors on all trucks to a maximum speed and then sealed by the city sealer, and a rule prohibiting trucks crossing boulevards before coming to a full stop. Overloading and open mufflers also would be banned. Motor truck manufacturers, owners and automobile dealers are opposing any drastic action at this time which would injure an industry and traffic that was proving of great benefit to the general public.

### RUGGLES HEADS DALLAS CLUB.

Dallas, Tex., June 26—E. Dick Spillers, for several weeks manager of the Dallas Automobile Club, has resigned that position to become connected with the Circle Automobile Men's association of America. Mr. Spillers will be succeeded by William R. Ruggles, former sporting editor of the Dallas News. Mr. Ruggles will assume his new duties next week.

## Small Louisiana Town Has a Real Truck Tour

### Lafayette Dealers Give Pointers to Larger Cities in How Demon- stration May Be Run

LAFAYETTE, LA., June 25—This small Louisiana town has just completed one of the most successful truck tours ever held in the interior of the state, when the Lafayette Truck and Trailer association made a tour of eleven prosperous young cities in this part of the state. This association is composed of the Teche Motor Co., the Lafayette Motor Co., the Steam Motor Co., and the Bileaud Motor Co. Bienvenue Roy, of the Lafayette company, acted as marshal of the tour, in which eleven trucks took part.

The route of the trucks, all of them heavily laden with merchandise from Lafayette stores for retailers in the towns visited, was west through Rayne, Crowley, Jennings and four smaller towns, and thence back the same way, the same day. Bright and early the following morning, the trucks, similarly loaded, started eastward, this time visiting New Iberia, Jeaneretta, Baldwin, Franklin, Centerville, Patterson, Berwick and Morgan City. In each of these places stops were made, a jazz band which accompanied the tour, playing from one of the trucks while the others unloaded their goods or paraded the streets.

At Morgan City, the largest city of western Louisiana, and a considerable inland port, the motorists were held up and compelled to remain all night to attend a ball given in their honor. C. A. King, of the Firestone Ship-by-Truck Bureau, and T. C. Childers, of the Gulf Oldsmobile Co., both of New Orleans, accompanied the truck tourists, and gave valuable aid to them out of their experience with truck tours from New Orleans.

### PREDICT ADVANCE IN ROAD PRICES

Washington, June 26—Predictions of the Advisory council of Sand and Gravel Producers that the cost of road building would increase \$1000 per mile, has created much comment here. Officials of the Bureau of Roads believe that such an increase would deal a body blow to the good roads movement.

The Advisory Council has protested to the Interstate Commerce Commission against the advances in freight rates proposed by the railroads. It is claimed that a 25 per cent increase in freight charges on a ton of gravel automatically adds \$1000 per mile to the cost of road building. Road experts say that construction costs have increased \$1200 a mile since 1916, due almost entirely to advances in freight rates. The contention is advanced that there is no need for higher rates on sand and gravel inasmuch as the loss in revenue can be regained by increasing those rates now preferentially low.



## Banker Sees No Action Against Automotive Industry

### Chicago Financing House Head Declares Credit Situation Is General, Not Discriminating

CHICAGO, June 25—There is not the slightest evidence that the Federal Reserve bank nor any of the larger banks in the Chicago Federal Reserve District are exercising any discrimination against the automobile business, according to W. G. Tennant of Tennant Motor Ltd., one of the largest automobile bankers in the middle west. Mr. Tennant, in addition to his banking experience, was one of the pioneer automobile dealers of the United States, handling the Oakland in Chicago for many years and is well qualified to sum up the situation at present.

There unquestionably has been a slight tightening of credits in all lines of business in the last few months, says Mr. Tennant, but aside from in the Kansas City and Atlanta Federal Reserve Districts, the automobile industry has not been singled out. The Federal Reserve banks, he declares, are merely reflecting the tendency of all business to shorten credits and if the automobile business has seemed to suffer more than others, it is because the automobile, by its very nature as a comparatively expensive commodity, would be one of the first things affected.

#### Dealers Give Too Much Credit

Hysterical credits given by many automobile dealers are held by him as one of the causes of the present situation. Automobile dealers, he says, have extended the most absurd sort of credits to customers, credits which business men in other lines would never extend. The fact that 85 per cent of all automobiles sold in the United States are sold on the part payment business is cited as an example of the wide credit the automobile men have been in the habit of extending.

Mr. Tennant believes that dealers in medium priced cars will be the chief sufferers as the result of curtailed credits. He points out that the greater number of the ultra-expensive cars are purchased by persons who are able to pay cash down without any sacrifice while the low priced cars go to persons who have been saving up money to purchase a car and are prepared to make payment in full.

Medium priced cars, on the other hand, are purchased largely by small business men and professional people. These purchasers, he says, are the ones who demand credit and financing and with credit shortened and high rates of interest prevailing, they will be less likely to purchase cars.

An interesting sidelight in this connection develops in the fact that many automobile financing houses throughout the United States have virtually shut down on loans to wage-earners to whom

a year ago wide credit was extended while credits to professional people and salaried people are almost unchanged. This would indicate that the brokerage houses do not consider that the manual laborer is nearly as good a credit risk as he was twelve months ago.

#### MILWAUKEE DEALERS HAVE OUTING

Milwaukee, Wis., June 26—All kinds of athletic features, including baseball, golfing, swimming, tennis, bowling, billiards, etc., were on the program of the three day outing and picnic of the Milwaukee Auto Dealers, Inc., at Lake Geneva, Wis., June 21, 22 and 23. A caravan of about forty automobiles left Milwaukee Monday to transport the dealers to the resort, and a band accompanied them.

#### APPLETON CONCERN ENLARGING

Appleton, Wis., June 26—The N. and M. Motor Car Co., which recently purchased the Union hotel building at State street and College avenue, Appleton, Wis., is converting the building into a modern salesroom and garage. The building will be entirely rebuilt and strengthened, providing modern facilities for the motor car business. Occupancy will be taken within sixty days.

#### HAS NEW RECHARGEABLE BATTERY

Chicago, June 25—A dry rechargeable battery is to be placed upon the market by Paul Rabe, president of the O. K. Giant Battery Corp. which has its factory at Gary, Ind. Numerous claims are made for the battery, among which that it is non-freezable and functions under all circumstances. One of the tests which is said to have been given the battery is freezing it for twelve hours in a cake of ice and afterward exposing it for twelve hours to a temperature of 11 deg. below zero.

#### EL AUTOMOVIL AMERICANO A MONTHLY

New York, June 26—With its October issue, El Automovil Americano, the automotive export publication in Spanish of the Class Journal Co., will become a monthly. This change from its issuance each quarter has been necessitated by the greatly increased use of American automotive equipment in Central and South America, Spain, Portugal and other Spanish and Portuguese speaking territories in which the magazine circulates.

El Automovil Americano was established four years ago as a publication devoted to the American automotive industry and serving as a medium of exchange between it and the automotive trade in the various countries of its circulation. It devotes itself to passenger cars, trucks, tractors, motorcycles, airplanes, motorboats and automotive accessories and equipment.

It is published by the Class Journal Co., which also publishes Automotive Industries, Motor World, Motor Age, The Commercial Vehicle, Motor Boat, Distribution & Warehousing, and The Tire Rate Book.

## Los Angeles Tractor Show Set for September 20 to 26

### Farm Trucks Will Be Included in Display to Be Staged By Pacific Coast Dealers

LOS ANGELES, June 28—The National Tractor and Implement show will be held Sept. 20 to 26 at Los Angeles, Cal. The dates were announced this week by the Tractor and Implement Dealers' Association of Southern California, under whose direction the exhibit will be held, in co-operation with the California Tractor and Implement association, Portland Tractor and Implement association, and the Northwest Tractor and Power Farming association. Farm trucks also will be shown.

Guy H. Hall has been secured by the Los Angeles organization to manage the show. Mr. Hall was the manager of the five successful National Motor shows held at Kansas City and is the secretary of the Kansas City Motor Club. Mr. Hall has just returned from California where he completed preliminary work of arrangement and spent several days going over the territory.

The setting for the show will be one of the most novel and beautiful that has ever formed a background for a tractor event. It will be an outside show. A sycamore grove in a canyon, almost within the city limits of Los Angeles, will be the scene of the exhibit. Ample transportation facilities will be available for both exhibitors and spectators. Street cars go to the grove and motorists traverse concrete paved roads.

More than 300,000 sq. ft. of exhibit space is available. California companies have placed applications on file for a total of more than one-third of the available space. Exhibitors are being warned by the management of the show of the necessity of shipping their exhibits early in an effort to avoid delay.

Mr. Hall says that he found the press anxious to co-operate with the management of the show. The California dealers' association will spend approximately \$25,000 advertising the event, to assure its obtaining widespread publicity throughout all of the Pacific Coast territory.

The Pacific Coast exhibit is one of two that obtained the official endorsement of the National Tractor Demonstration and Show committee of the National Implement & Vehicle association at its recent meeting. Application has been made to the Motor & Accessory Manufacturers' association for their endorsement of the event.

#### SPACKE TO ENLARGE PLANT

Indianapolis, June 26—To meet the growing demands for the light car, low in first cost and operating costs, the Spacke Machine & Tool Co., of Indianapolis, plans for expansion of its business. Enlargement of the four plants already occupied by the company is part of the plan of building the production of these light cars to 150 daily.

## Southern Association Acts Against Dealers Without Service Facilities

CHARLESTON, June 26—A concrete example of the strength of automotive dealer co-operation in the south was given here this week, when the South Carolina Automotive Trade Association had a large part of its membership of 250 at a two-day convention which took action to improve trade conditions and to support movements of important public and business nature. The association, organized only eight months ago, endorsed the Townsend federal highway bill and the National Automobile Dealer Association, got behind the state highway commission in its effort to get the state out of the mud and made preliminary plans to hasten elimination from the business of dealers without service facilities, of whom there are quite a few throughout the state. It is probable that association advertising, emphasizing the association code of ethics and what it means in the way of adequate service to the car and truck owning public, will be employed to enforce the "curbstone" merchant out through loss of patronage.

The dealers heard from notable public men, one of them, R. Goodwin Rhett, state highway commissioner and former president of the United States Chamber of Commerce, about projects for high-

way, port and cotton raising developments getting under way to put this state on a par with neighboring commonwealths, which progressed while it recovered slowly from the effects of the reconstruction period. In Rhett and in J. S. Wanamaker, president of the American Cotton Association, were found ardent advocates of the utility of the motor car and truck and of roads fit for them to travel on.

The dealers made plans for active work for fair legislation and for extension of the membership to include one thousand car, truck, tractor and equipment dealers and garagemen. In addition to the public men, speakers included Neal G. Adair, editor of Motor World, and John O. Munn of Toledo, dealer counselor in the building of a market.

### TWIN CITIES SERVICE MEN MEET

Minneapolis, June 27—The final meeting of the Northwest Automotive Association until the third week in September was held June 21 in the Manufacturers' club, with a discussion as to methods of making charges. After a warm handling of the question adjournment was taken without coming to any decision. The directors will meet every two weeks to take care of any subject that arises, one already decided upon being a conference with Dunwoody Institute as to future training of automobile mechanics and the requisites therefor.

In the fall it is planned to take up a series of conferences or talks which will inform automobile owners what they may expect of a service station and what they may do to help out the service manager. They will be instructed also as to the operation of cars in cold weather and the effect upon a battery of a temperature below freezing and upon the operation of a car when it is 10 below zero or lower. Complete co-operation with the owners in various ways is to be taken up.

### COMPLETE ADVERTISING BODY

Detroit, June 25.—Factory advertising managers will meet Wednesday to conclude the organization to be known as the Automotive Advertising Association. General Manager Alfred Reeves of the National Automobile Chamber of Commerce will be present. The plans for affiliation with the Chamber of Commerce have not yet been ratified, but in all probability that action will be taken by the meeting Wednesday.

### INVENTS NEW FILLING MACHINE

Buffalo, June 26—"Long distance" filling of automobile tanks may become the rule in the United States if an invention of N. A. Beach of PennYan, near Buffalo, is found practical.

Mr. Beach has invented an electric, automatic filling device which he claims tests have shown to be efficient and

satisfactory. An electric switch operated in a central station permits any required number of gallons of gasoline to flow into a receptacle from which the motorist fills his car's tank without attention or service of the filling station operator, who remains at his switches. One operator may control numerous fillers at the same time.

Similar devices permit sale of oil without handling. It is the claim of the inventor that his devices is the most economical and efficient means of handling oil and gasoline. A test service station in PennYan is being closely watched by the inventor and men who are financially interested in the device. Patents have been obtained.

### MAY USE TRUCKS FOR ROADS

Atlanta, Ga., June 26.—The embargo placed on freight cars by the Interstate Commerce Commission as a means of relieving the acute coal situation in the Southern Appalachian coal districts and in other parts of the country, will not affect road work now going on in the South, according to information that has been received in Atlanta by the Georgia state highway board. The board had appealed to the commission to modify the embargo so that it would not include cars used in the hauling of road building material. Other state boards had also appealed to the commission as such an embargo would have automatically put a stop to the millions of dollars worth of road work now going on in the Southern states. The information coming from Washington was to the effect that it had not been intended to include cars in this embargo that were used for road building material and therefore the road construction program will go on without interference. In Georgia alone, such an embargo without this provision would have halted about \$7,000,000 worth of good road work.

### COLUMBIA TO GIVE SERVICE COURSE

New York, June 28—Columbia, which was one of the first universities to give official recognition to the automobile, will give a course in automobile mechanics at its summer session which begins July 6. The mechanical and electrical problem dealing with the construction, operation, adjustment and care of the motor car will be studied. The work will include the assembling and disassembling of the parts, locating and correcting troubles and a study of the essential principles of gas engines, carbureters, ignition systems, starting and lighting systems, cooling systems, clutches, gears and differentials.

### LEAGUE OPPOSES MOTOR CAR TAX

New Orleans, La., June 25—The board of directors of the Motor League of Louisiana has made such a strong protest to the city government against the plan to impose another tax on passenger cars to maintain the roads in the public parks of the city that the proposed ordinance will be given a largely attended public hearing soon. Both the Milner and Dowling bills, now before

### JOIN TRUCK PROTECTION BODY

Atlanta, Ga., June 26—More than 2,000 motor truck owners throughout the state have joined the recently organized Georgia Motor Truck Protective Association, and thus pledged the use of their trucks for public service during any emergency which may arise. The association was formed about two months ago at about the time railroad transportation was more or less tied up by a strike of the clerks, and it was noted what really could be accomplished with the aid of motor trucks during such an emergency. The sole purpose of the organization is to take care of any such emergency which may arise in the future.

Benjamin Gilham, secretary of the association, stated that new members are joining daily and that the total enrollment of 2,000 will probably be swelled to 5,000 by the end of the year. This will mean representation in every city and virtually every small town and community throughout the state, and any railroad tieup which may occur at any time in the future will have no serious effect on industry or business as a result of this association.

Mr. Gilham also announced that one of the problems the association had to take care of was the securing of fuel oil in case of an emergency, and he stated that arrangements have now been completed to keep up the supply throughout the state in case of emergency at any time without the aid of the railroads.



the state legislature, provide for the doubling of the tax on automobiles throughout the state, to raise more funds for good roads, and the Motor League feels that the motorist has been taxed sufficiently, without having to pay also for the upkeep of the park roads of New Orleans.

The league also, by resolution, petitioned the city commission council to remove the "bumps" put at a number of uptown crossings to compel motorists to slow down, and thus avoid possible collisions. "There are enough bumps in the streets of New Orleans now, without having them manufactured for us," says the resolution.

#### BOSTON CREDITS ARE CUT

Boston, Mass., June 27—Some of the larger distributors are finding conditions a bit serious here. Sub-dealers have been unable to get their local banks to advance them any money on motor car shipments, and so they have had to cancel orders for cars that were on the way. This has thrown the cars back on the distributors. Some of the dealers find that the customers are making cancellations, and a few have found buyers unable to meet notes. There has been a general slowing up of sales for the past few weeks. It has not resulted in any unemployment as yet. Another reason why there has been a slump in sales is the bad weather. More rain than ever before for the same period in the past five or six weeks, particularly on Sundays and holidays, has kept people indoors and they are not looking for cars. The tire people have felt it. There has been but one or two real motoring days at a week and all spring.

## New York Dealers Plan Independent Truck Exhibition for Next Year

NEW YORK, June 25.—The Automobile Dealers' Association of New York is planning a truck show in the same week that the national passenger car show is staged by the National Automobile Chamber of Commerce in Grand Central Palace. A resolution to hold the show was adopted by representatives of leading truck dealers at a meeting yesterday and directors of the association will be asked to sanction project. A site for the truck show will not be sought until the directors have approved of it.

Prior to the meeting, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, had declared to Harry T. Gardner, executive

secretary of the Dealers' Association, that the chamber had given up the idea of a truck show. He said, however, if the dealers desired to stage their own truck show the National Chamber would be in entire sympathy with the move.

A committee to plan the show will be appointed at once by President William C. Poertner and W. O. Crabtree, director, representing the truck division of the association.

As outlined by the association, the truck show will be limited to New York dealers who will be allotted sufficient space to permit of working demonstrations of their exhibits, rather than a still showing, if they desire to show their trucks in operation.

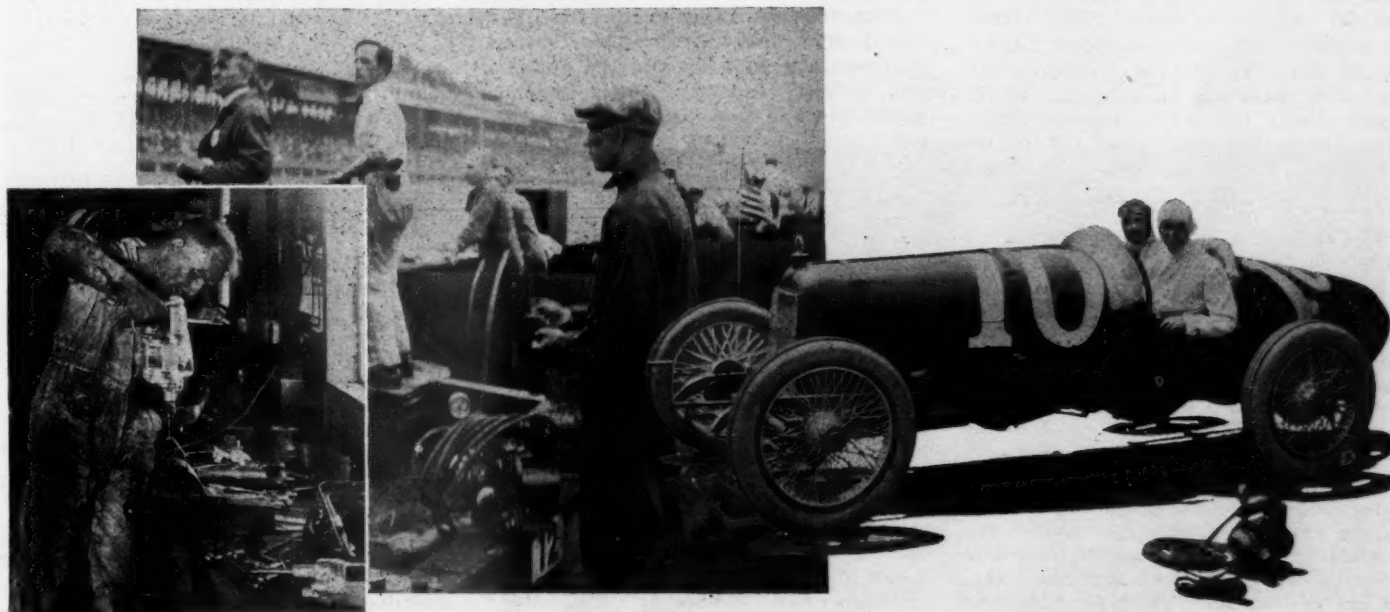
#### BILL OF SALE REQUIRED IN GEORGIA

Atlanta, Ga., June 26.—Automobile thefts have grown so numerous in Atlanta and throughout the state of Georgia during the past year that the present session of the Legislature is to consider an amendment to the state automobile laws that will probably have the effect of curtailing this thievery to a considerable extent if it becomes a law. The principal feature of the new law is the requirement that a bill of sale must be given to the purchaser of every second hand car by the dealer or the person selling same, and this bill must be investigated and verified by the sheriff and then placed on file with the Secretary of State.

#### END ST. LOUIS WALKOUT

St. Louis, June 25—Transfer drivers and chauffeurs have ended a walkout which has been in effect several days. A committee of the union and the wage committee of the Team and Truck Owners' association reached a compromise under the terms of which the men accepted the employers' offer of \$34.20 a week and gave up their demand for \$36 a week. The wage was \$27.50 before the walkout. The working hours are reduced, however, from 10 hours to 9½ hours, with time and a half for overtime. The rate of \$34.20 is for drivers of two-horse teams or trucks of like capacity. Drivers of one-horse wagons will get \$26; \$40 a week for largest trucks.

### A Real Holiday for Fred Duesenberg



Fred Duesenberg made a clean sweep of the recent 250-mile race at Uniontown, taking the first four places. The central picture above shows Duesenberg directing his team by signals, at the left a corner of the Duesenberg garage and at the right Tommy Milton, winner of the race

## School Girl Wins New Orleans "Ship-by-Truck" Prize

New Orleans, La., June 25—A girl, Miss Marion Marechal Cuthbert, of Sophie Wright High School, won the "Ship-by-Truck and Good Roads" essay contest held here late in May, according to announcement just made by the judges. To Miss Cuthbert went the scholarship in the Soule Business College, presented by George W. Stem, district manager for the Wichita Falls Motor company.

Carroll Granger, a student in St. Aloysius' College, and Mildred Krenkle, a student of the Esplanade Avenue Girls' High School, won \$50 each, one of the fifties being awarded by the Packard Motor Car Co., through the Abbott Automobile Company, and the other by The Item, a daily newspaper of New Orleans.

Miss Cuthbert's essay, which was written in rhyme, reads as follows:

*The man of to-day with his hard, horny palm,  
Is the grower of all foodstuffs produced on the farm.  
To him we must look for all things that we eat,  
Our eggs, milk and butter, every pound of our meat.  
Life would soon be extinct for the man of yon town,  
Were it not for the farmer who tills the rich ground.  
Should the farm hold its product forever and aye,  
The whole world of people necessarily must die.  
But instead, to the market, each commodity goes,*

*And the farmer reaps coin from the seed that he sows.*

*Shipping is the problem, transportation's too slow,*

*When orders are wired, all shipments should go.*

*The problem is solved—Good roads is the need,*

*'Tween the farm and town markets—to make us succeed.*

*And on the good roads let the Motor Truck spin.*

*Then producer and buyer and consumer, all win.*

*Have Good Roads, Ship by Truck, Mr. Farmer, take heed,*

*Your worries are over, the Truck's what you need.*

*No delay in your shipments, no goods gone astray,*

*Rush orders received, soon your truck's on its way.*

*Good Roads are essential—Good Trucks I say, too,*

*Success is assured—Who'll co-operate? You?*

*Goods shipped to market by the Motor Truck way,*

*Runs no chance of decaying, no need-less delay.*

*If by Truck dairy products are delivered in town,*

*They're as sweet, fresh and perfect as when leaving the farm.*

*And beside the good farmer we must now talk about*

*The merchant in town who has goods to send out.*

*The country folk's trade is an Item, indeed,*

*And safe, prompt deliveries should be made with all speed.*

*Good Roads pave the way between buyer and grower,*

*And to city and country bring benefits galore.*

*The splendid "Wichita" Motor Truck, let me say,*

*Is the one that you need in your business today.*

*And the "tried and true Packard" of worldwide spread fame,*

*Will convince the truck owners there's much in a name.*

*But "Wichita" or "Packard" you will rightly deduce.*

*That the "Pneumatic Firestone's" the tire for all use.*

*And please don't forget the "Innertube" of today,*

*Is also stamped "Firestone" and it leads the way.*

*Now, my dear Mr. Farmer, may I say that I know,*

*If you ship by truck, forthwith, your business will grow.*

*And you need fear no losses, no buyers need wait,*

*Your goods for the market will never be late.*

*"Ship by Truck Good Roads" let us boost with a vim,*

*For such is the logical way to begin.*

*Get in touch—get together and all do our part,*

*To truck on Good Roads our goods to the mart.*

*Then—Hurrah! for Good Roads, Good Trucks and the Man,  
Who will make the first move toward success of the plan.*

### WHAT IS WRONG WITH PRESENT "AUTOMOBILE NEWS?"

(Concluded from page 17)

licity of the future must be of a nature which will be helpful to the car owner, not the car dealer. The car dealer can look to the business papers for his helpful material. What John Jones, president of the Universal Motor Car Co. thinks about the chances of communicating with Mars can be relegated to the trash heap; but what Sammy Smith, who knows the inside and out of the Universal car can tell about how to get better mileage out of the car in summer, is stuff that will help owners of Universal cars, who, incidentally, are readers of the Daily Warcry.

Suggestions that "automobile news is just as legitimate as news of the theatres or baseball news" should be soft-pedalled. They smack too obviously of insincerity. How would the maker of a new model Podunk car like to have some automobile editor remark, "aside from squaking in nine places, getting only two miles to the gallon of gasoline and being unable to climb a 2 per cent grade except in reverse, the new model Podunk is a good car," as the dramatic editor is likely to say about some theatrical production? Or how would he like to read, "The Podunk is up against it this year. It hasn't got the stability or speed of the Universal and can be counted out of the running until it is re-

designed," as a baseball editor is likely to say about his home-town team? He wouldn't like it, would he?

So don't try to put automobile in the theatrical or baseball class unless you want to take along the penalties as well as the advantages of that classification.

Next week I'm going to try to tell you how I think dealers, manufacturers and everyone else interested in the automobile industry can help put automobile publicity on a higher and more legitimate basis.

### S. A. E. RECOMMENDS HOT SPOT MANIFOLD

(Concluded from page 14)

tory operation it has been found that intake manifold velocities up to 150 feet as a maximum and 120 feet per minute as a minimum are best.

Mr. Scarett, president of the Minneapolis S. A. E. section, described a type of hot spot manifold which he designed and which has been very successful in operation. This manifold is shown in Fig. 2. The exhaust gases are brought to a Y connection with the intake manifold by passing the exhaust outlet through the central passage between cylinders Nos. 2 and 3. The intake charge impinges directly against the umbrella-like roof of the hot spot and the small dams create eddy currents that break up the fuel particles as far as

possible. Those particles which are not broken up are thrown to the surfaces, and from here drained to the heated pool which is not in communication with the air column. Mr. Scarett stated that this manifold had been operated for periods of one hour under idling conditions at 100 r.p.m. Upon suddenly opening the throttle the engine rapidly accelerated without displaying signs of manifold loading. This is an extremely good test and represents some of the progress being made under the present trying conditions.

### PARISH TO STUDY TRACTORS

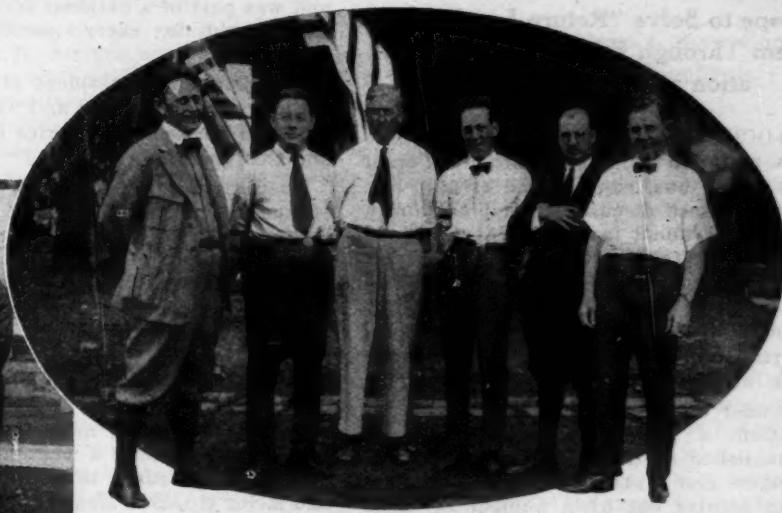
Amite, La., June 25—Tangipahoa, one of the wealthiest parishes of Louisiana, whence is shipped every year nearly \$3,000,000 worth of strawberries alone, in addition to half as much more in garden truck, has collected \$2,000 from farmers, business men and bankers with which to send eleven young agricultural students on a tour of the principal agricultural colleges and farming sections of the United States to study the most modern methods of agriculture, with especial attention to the use of tractors, tractor-cultivators, motor trucks, and home electric systems. They will leave the first of July, be absent about a month, and report to a meeting of the farmers of the "strawberry basket" of Louisiana, on their return to Amite.



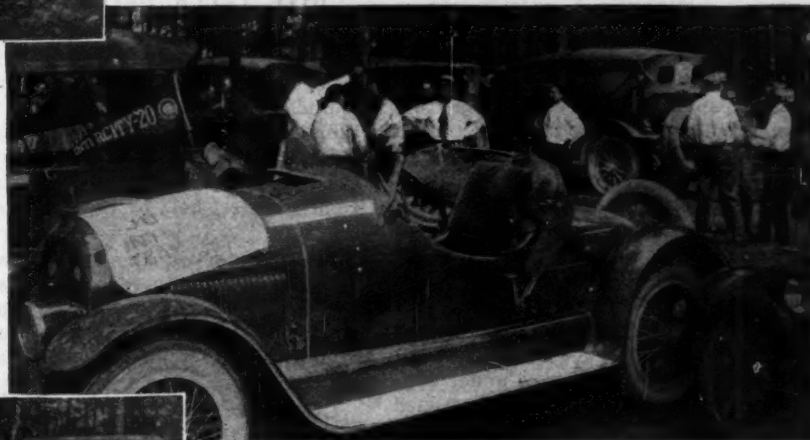
## Some Scenes in the New York-Chicago Reliability Run



Officials of the race visited at Kentland, Ind. the grave of Darwin S. Hatch, late Editor of MOTOR AGE who, during his lifetime, was one of the most enthusiastic amateur drivers in the Middle West and who was a constant attendant at Inter-City and Inter-Club reliability runs. From left to right the men are: J. C. Davis; Charles Gregory; H. P. Branstetter; J. T. Brown; John Brewer; Joseph Callender



Members of the New York team, left to right, C. G. Sinsabaugh; George Ballou; George Ade; L. P. Wilkins; George Morrow; W. C. Poertner



The contesting cars parked during the noonday control at George Ade's farm near Brook, Ind. Mr. Ade, who is an amateur driver of note himself, has played host to the drivers on interclub runs on numerous occasions and this year when the tour was shifted at the eleventh hour from Chicago to Peoria and return to Chicago to Indianapolis and return, he asked that his farm be made noon control



Charley Gregory and Charley Root don't believe in letting other people do all the work,—even if they have to climb stone fences to do their share

(At Right) Members of the victorious Chicago team, their host and some of the officials of the run, left to right, standing, C. G. Bougham; B. B. Ayers, F. J. Wagner; F. W. Wentworth; George Ade; A. J. Banta; L. M. Collasky; A. N. Eastman; kneeling, F. J. Judd; R. W. Tansill; S. E. Hibben; R. C. Cook



## Rochester Truck Men Plan a Cooperative Bureau

**Hope to Solve "Return Load" Problem Through Exchange of Information and Central Terminus**

ROCHESTER, June 26.—Rochester's tentative plans for an organization of all motor bus, express and freight line owners were discussed and plans for a central terminal made at a meeting held here under the auspices of the Rochester Auto Truck Dealers' Association. A score of owners present declared that they would give the association all the support it would need if such a plan was put through in this city.

Under the present plans of the organization a central terminal will be established so that the handling of passengers and express can be expedited. It was pointed out by a number of those present that the business of the truck owners would increase 50 percent or more if the plan was put through.

At present the truck owners are forced to go around the city to collect express and freight shipments, and this means considerable loss of time inasmuch as the dealers keep the owners waiting from fifteen minutes to an hour every time a load is called for. Under the terminal plan, it is pointed out, all express and freight shipments would be at a central point and there would be no waste of time in collecting them. One of the owners declared that with a central terminal he could make an extra trip a day.

What plans the truck owners will follow in establishing a terminal is still problematical. Two plans are under consideration at the present time, that used in Grand Rapids, Mich., and the other in the Twin Cities of the Northwest. It is probable that the plans of both these cities will be incorporated so as to produce a better working organization.

That the establishment of terminals in every city is bound to come, and that Rochester should be foremost in marketing the fruit products of this section by means of the motor truck, was the declaration of N. H. Candler, secretary of the Rochester Auto Truck Dealers' Association in boosting the project.

According to rumors, three of Rochester's largest department stores are willing to back the proposition with \$20,000 if a terminal is constructed. One plot of land already has been offered to the motor bus line owners, a plot 100 by 333 feet. Committees to look after the financing of the proposition and to secure a site for the terminal have been appointed, and they are working with the Chamber of Commerce traffic committee in this city.

### 800 IN GYPSY TOUR

Boston, June 27.—Eight hundred motorcycles of all makes and power participated in the annual gypsy holiday tour from Boston to The Weirs, N. H., yesterday. Many went solo. Others had side cars in which they packed whole

families to enjoy the outing to New Hampshire. This two-day run to The Weirs was under the auspices of the Massachusetts Motorcycle Association and was part of a national series of runs being held in every section of the country.

Jess Campbell, president of the association, was tourmaster and was assisted by Tour Lieutenants Charles Cartwright and George Ellis.

There are several hundred motorcycle enthusiasts among the young women of Boston, judging by the number who braved the dangers of riding tandem astride the rear seat of some of the powerful machines entered in the tour.

At noon basket luncheon was served at Concord, N. H. There was a sail around Lake Winnepesaukee in the evening. That was followed by a banquet and motion pictures of motorcycle events. Selecting the side of a mountain, a number of drivers raced to the top for gold and silver trophies. Demonstrations were given to show the power and performance of the two-wheel machines.

### GIVE TRUCK DRIVING PRIZES

Boston, June 26.—Striking demonstrations of the saving which owners of trucks can make through intelligent application to their business of the national standard truck cost system were made by the five prize winning trucks in Greater Boston during the recent efficiency contest held by the Packard Motor Car Co.

Hundreds of trucks all over the United States took part in the contest which is the first of the kind to cover an entire year and offers a more satisfactory basis of information than any previous truck tests.

George O. Jenkins Company, Bridgewater, got the third prize in Class F (5 tons). The record of performance of this truck shows that the cost per mile was reduced considerably by correct application of the standard cost system.

### FORM NEW RACE ASSOCIATION

Boston, June 25.—The latent interest which always has been shown in the sport of automobile racing by the motor-inclined population of Greater Boston has burst forth in the organization and incorporation of the New England Automobile Racing Association, a \$50,000 corporation with prominent local automobile men as stockholders.

The first race meeting under its auspices and rules will be held at Combination Park on the holiday, July 5.

While entries to the various events will not close until the latter part of next week, it is almost certain that at least five drivers of national fame will appear on the Medford track that day to compete for the substantial purses which will be awarded the winners.

The card calls for at least two races against the time in which records are due to fall; an Australian pursuit race and an elimination contest in which the speed wagons are started from different points around the track.

## International Plans New Fort Wayne Truck Plant

**First Unit of New Factory Which Will Employ 1000 Men Is To Be Started This Fall**

FORT WAYNE, Ind., June 28.—Fort Wayne citizens are enthusiastic over the announcement just made that the International Harvester Co. has secured a 140-acre site east of this city and will in the fall begin the erection of the first unit of a motor truck manufacturing plant which it is expected will eventually grow into one of the company's biggest plants. At the outset the plant will employ 1000 men, according to the statement made by Harold F. McCormick, president of the company, and will be used for the purpose of assembling, painting and preparing for shipment the machined parts of trucks manufactured at the company's Akron, Ohio, plant.

Fort Wayne was chosen as the site for the plant after the company had thoroughly investigated the conditions in twenty-eight cities. And it is stated by Mr. McCormick that one of the reasons why Fort Wayne was picked is because of the spirit manifested by the local Chamber of Commerce. When it became known that there was a chance of landing the plant for the city the Chamber of Commerce appointed special committees who co-operated with the company officials to the greatest possible extent in furnishing data, securing the site, etc.

It is stated that the site is the largest yet secured by the company for manufacturing purposes and it is taken as an indication of the fact that the local plant will eventually grow to a point where it will be one of the largest of the concern's twenty-eight American manufacturing plants.

### COAL EMBARGO FOR DETROIT

Detroit, June 26.—A coal embargo on Detroit already is partially in effect and a tie-up of all freight congestion to this city is threatened by the interstate commerce commission, on account of the delay in unloading cars in the local terminals. A telegram to the board of commerce today stated that loaded freight cars were congesting the sidings, the terminals and even the main tracks. The telegram urged that shippers inaugurate a drive to relieve the congestion working throughout the nights and all day Saturday and Sunday, as the only hope of preventing a strict embargo.

The present coal embargo was invoked because of the alleged delay in unloading coal cars. The commission issued a ruling that coal must be unloaded within 24 hours after received and the embargo stipulation provides that no coal shall be started from the mines to any dealer who fails to comply with the twenty-four hours provision.

A concerted effort will be made to-day and to-morrow to get freight cars unloaded in so far as possible in an effort to stave off the embargo.



## Twin Cities Garage Men Seek Better Mechanics

### Dunwoody Institute to Provide Courses of Instruction for Men Learning Repair Work

MINNEAPOLIS, June 25—The Minneapolis Garage Owners association at its semi-weekly meeting June 18 took up a project to provide more and better garage mechanics, with the idea of reducing costs and turning out entirely satisfactory work. At present the condition is unsatisfactory because garages are absorbing students in automotive mechanics before they complete their studies.

By this agreement the Dunwoody Institute is to provide special apparatus to cost about \$80,000, and is to provide instructors and class rooms, with the agreement that the garage owners are to use the institute as the source of their mechanical forces as far as practicable, and to assist in keeping the apprentices in the institute classes until they get their certificate of graduation.

Secretary Perry R. Moore was authorized to take up with all garage associations the Minneapolis plan of getting trade discounts on purchases of parts from automobile distributors for members of the association who can exhibit monthly cards of membership. This plan is to be explained fully to the service division of the National Automobile Chamber of Commerce.

Seven members were elected to the association, making the total eighty-seven. The association will prepare bills to submit to the Minnesota legislature at its next session covering a lien law similar to the Kansas law, relief from the present obligation to carry insurance covering against suit by the insurance companies for losses on policy holders' cars by theft or fire while in the garage and through negligence on the part of the garage. Other measures for discussion were state licenses based on horsepower for passenger cars and capacity for trucks, and appointment of garage owners as special police or deputy sheriffs to assist in traffic ordinance enforcement.

### PACKARD GRADUATES DRIVERS

Minneapolis, June 25—After eight weeks' session the truck drivers instruction school in the Twin City plants of the Joy Bros. Motor Car Co. has closed, graduating forty men last week in St. Paul and 25 in Minneapolis, twenty having been given diplomas previously in Duluth. The credit cards were passed out at a smoker.

In St. Paul the high man was Roy Moses, 99 3/4%. Mr. Moses had won a prize previously in the Packard Co. efficiency contest. In Minneapolis cards were given to E. A. Wahlund and Robert B. Adair, receiving marks of 98 and 97% respectively.

The schools have been so successful that they are to be carried on on a more

extensive scale next fall, two of the proposed features being laboratories for experimentation, and full working models for demonstration purposes.

The schools are not confined to Packard drivers. All are welcome. Through the winter office men, salesmen and officials have attended. The purpose is to make better drivers, to reduce repairs to a legitimate basis, ordinary work being taken care of easily by the drivers who have graduated, thus saving expense to owners. In the school year just closed there have been community sings, motion pictures, smokers, lectures by factory experts on ignition, gasoline production, batteries, etc.

The course consisted of eight business lessons of two hours each, one night a week. They were conducted by George Flad, service manager, and Sam Schultz, foreman of the truck shops. Test sheets were given out each week for answers to be filled in, the marking being on the basis of ten points for each question on each sheet.

### WOMAN WINS DRIVING CUP

Minneapolis, June 25—In the graduation exercises of the school of instruction for women automobile drivers operated by the Minneapolis division of the National Safety Council, assisted by the Minneapolis Automobile Trade association, the Minneapolis Civic & Commerce association and the Park board, Mrs. C. B. Cooper received a loving cup given by the Trade association for her record in driving. She brought down her car running on Lake Harriet commons at 25 miles an hour in 60 feet, to a dead stop. The second was Mrs. H. E. Young, who lost by 18 inches.

Mrs. Young got first place in the figure eight contest around white kegs placed on the course. Other tests were stops at 20 miles, 15 miles and 10 miles per hour. The 25-mile contest followed an elimination down to six contestants and the first two so nearly tied that a special contest was necessary. Judges were Lieut. John Hart, chief of the police traffic department; Dr. C. H. Kohler, president of the Minneapolis safety division; Judge T. H. Salmon of the city conciliation court; Secretary Walter A. Wilmot of the Minneapolis Automobile Trade association; Louis Nathanson of the Minneapolis civil service commission. The contests were directed by R. C. Haven, manager of the Minneapolis safety division, and L. M. Browne of the Trade association.

### HOFFERT HEADS MEMPHIS TOUR

Memphis, Tenn., June 25—C. B. Hoffert, who has been secured by the Memphis Automobile Dealers Association to manage the "motorize the farm" tours planned by that body has arrived and taken charge of arrangements. Actual demonstrations are being arranged for eleven cities: Millington, Covington, Henning, Ripley, Dyersburg, Trenton, Humboldt, Jackson, Brownsville, Stanton and Arlington. The caravan leaves Memphis June 28 and returns July 2.

## Tractors Are Demonstrated at Power Farming Meet

### 6000 Persons Attend Convention of Association at Moultrie, Ga., on June 15

MOULTRIE, Ga., June 25—Tractors, motor trucks and power machinery as used on the modern farm for the expedient production and marketing of crops, in the clearing of land, etc., was demonstrated before about 6000 people who attended a meeting here June 15 of the Power Farming Association of America. The demonstration took place all afternoon, the morning being devoted to addresses by well known men capable to speak from experience on the subject of power farming.

The large attendance, which included mainly farmers and planters, evidences the great interest men of the agricultural industry in the Southeast are taking in modern power machinery.

The meeting has a special significance at this time for up to the middle of May the weather was very inclement in this section of the country, causing a late and wet spring. As a result only those farmers and planters who used modern farm machinery, tractors, etc., are caught up with their plowing and planting, while the others are far behind and face considerable financial loss as a result. Farmers who did not have modern machinery know this to be a fact and hundreds of them attended this meeting to witness the actual demonstration. The result will doubtless be that the southeastern branches of the implement and tractor manufacturers, and dealers handling these lines, will experience a still greater demand. In the past three years the development of this industry in the South has been phenomenal.

Virtually every kind of modern farm machinery was demonstrated during the afternoon in land clearing, cultivation, hauling, etc., the manufacturers co-operating with the association in arranging the demonstrations through the loan of the machinery.

### ENJOIN STRIKING MECHANICS

Cincinnati, June 27—Suits to enjoin members of the International Association of Machinists from interfering with them in the operation of "open shops" have been filed in Superior Court by two automobile manufacturing corporations.

The O. Armleder Co. is suing the International Association of Auto Mechanics local union No. 1042 to prevent interference with its employees, who are now working under contract agreeing not to join a union. The Armleder Co. which normally employs about 175 men, says it has \$1,250,000 invested in its plant and also operates a service station.

The other suit against the union officers was filed by the Fox-Klein Motor Co. with offices at 807 Race street. It also seeks to enjoin interference of union men with its non-union employees.

# Garage Planning

## Service Station Arrangements

### No. 237

#### AN EIGHTY FOOT GENERAL GARAGE

Herewith is sketch of a garage I am planning to erect this spring. In connection with the garage, I want a showroom, stock and accessories room, repair shop, and offices.

Can you offer a better arrangement and furnish a general estimate of the cost?—Perry Johnson, Fredericktown, Md.

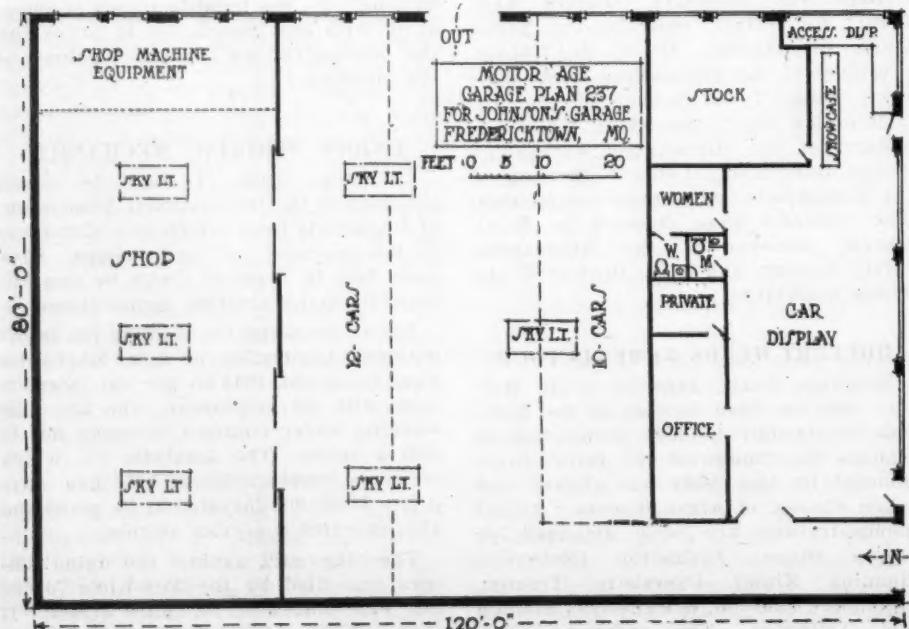
The only suggestion we would make is in regard to the arrangement of the entrance and the showroom.

We favor a single room, where it can be had, rather than a divided front with cars on one side and accessories on the other. A large single room is much more impressive than a small one, and it is much easier to watch and see that customers have attention. This last feature is of special advantage in these days of scarce labor.

We cannot make an exact estimate of the cost, two contractors probably will figure a difference of \$10,000 in bidding for the job. About all we can say is that if you build it as cheaply as you possibly can, it will cost you \$43,000 to \$48,000, and if you build better and with more expensive materials, it will cost \$50,000 to \$55,000.

This estimate is based on the cost of buildings we know of. If labor is well organized in your town, it will cost a few thousand more. It may cost more anyway, no one can tell.

Trusses for the roof of the building better extend from front to back in three sections.



No. 237. An eighty-foot general garage

### CONDUCTED BY TOM WILDER

MOTOR AGE is receiving many inquiries for garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage and readers are urged in asking for such plans to be used to include the following information:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

### No. 238

#### A STORAGE GARAGE

We are planning to have a small office and accessories salesroom approximately 14 x 20 feet in size, and a repair shop approximately 20 by 50; remainder of space to be used for washrack and storage. The sketch gives the sizes and shape of garage planned and its relation to streets and alleys. Am planning to

employ two men in repair shop and expect the garage to hold from seventy-five to one hundred cars.

Also give estimate on the capacity of same garage with a 75-ft. width.—E. G. S., Chicago.

The width of your lot is admirably suited to a storage garage. A 50-ft. space is ideal for economy of space, with maximum storage and accessibility; a 100-ft. width has the same advantage.

It would be unwise to make the office and accessory store so small. With such an extensive garage, you should do a good tire and accessory business, but it would be hard to work up such a business, unless you have space in which to display your goods and stockroom space for supplies.

Also, you should have a women's restroom; it now is almost a necessity in an establishment of this size.

We have made the shop wider than you have indicated. Twenty feet is sufficient space for a 16-foot car and a 30-inch bench, but it leaves no working space at the ends.

As your business grows and you find the shop is too small, it can be enlarged by taking in the washrack space and moving the washrack to the other side; or, anticipating such an enlargement, the washrack might now be installed on the other side.

Side windows in this building would be of little benefit. We advise lighting entirely by skylights.

Do not consider a 75-foot width. Rather, cut down the depth if necessary, or build one 50-ft. unit, and the other later on.

### No. 239

#### PLAN FOR SOUTH AMERICAN DEALER

We are enclosing a rough sketch of lot on which we are planning to build a garage.

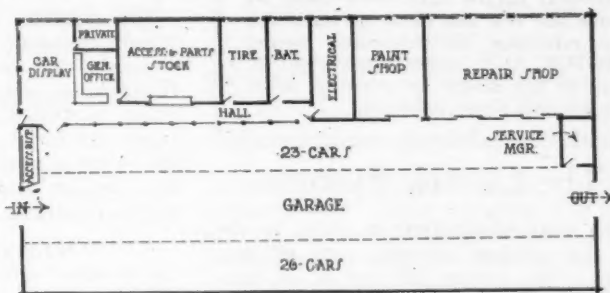
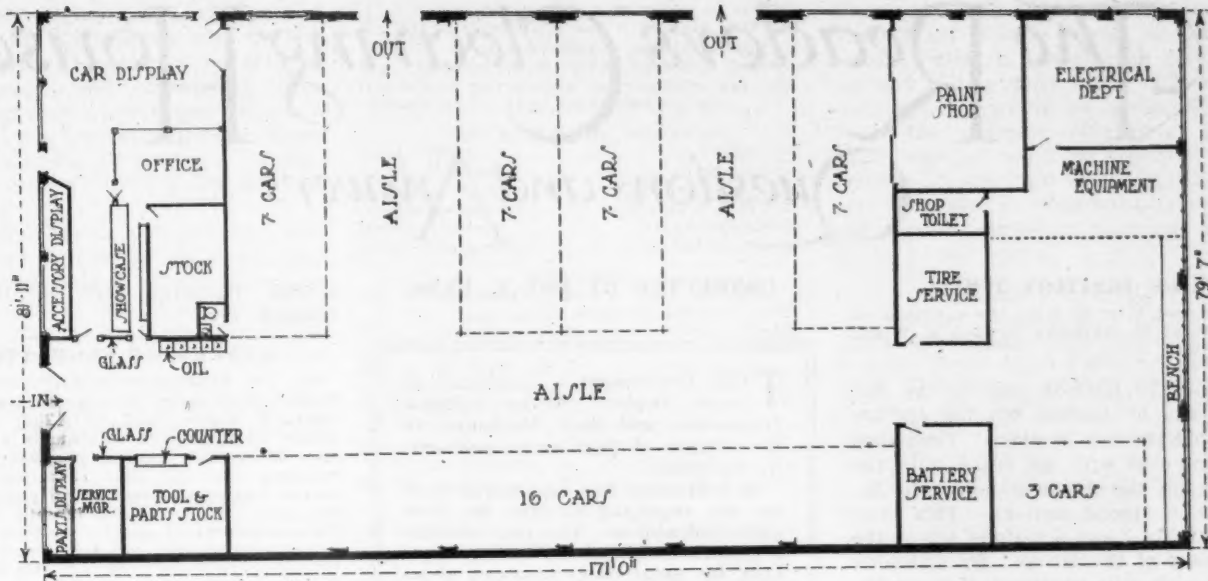
We wish to store about forty to fifty cars. Want a small store for accessories and showroom for one car on Main street front. Also, we want parts and tool department, general office, and a separate office for the technical or service manager.

We are planning to operate a repair shop, which will have to be about 50 ft. long, because the main shaft of the machinery will be in one line and of this length; also, a service station for batteries, magnetos, carburetors, and an electrical department for testing and repairing starting, lighting and ignition systems. In addition, we want a small paint shop and vulcanizing department. We want to have everything necessary to give service. Will you publish a plan?—The Automobile & Garage Co. of Ecuador, Guayaquil, Ecuador, S. A.

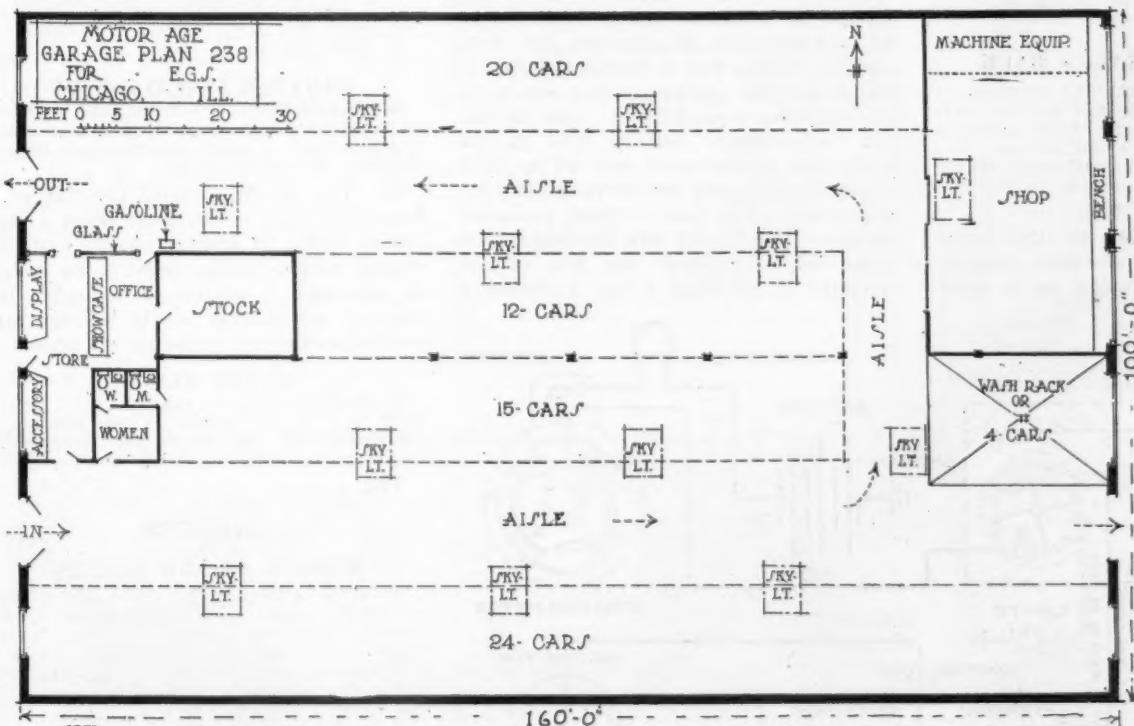
We have shown two layouts, each of which has features to recommend it. The larger one was made first—the second one, half size.

There is a difference of only about 60





MOTOR AGE  
GARAGE PLAN 239  
THE AUTOMOBILE & GARAGE COMPANY  
OF ECUADOR INC.  
GUAYAQUIL, ECUADOR, S.A.  
FEET 0 5 10 20 30  
SMALL LAYOUT  $\frac{1}{2}$  SIZE OF LARGE ONE



No. 239. Top,  
plan for South  
American garage  
company

No. 238. Left,  
a storage garage  
with a capacity of  
seventy-five cars

sq. ft. in the floor space occupied by the departments, other than the garage, yet the garage in the smaller sketch, which is 60 sq. ft. smaller, will hold five more cars than the larger layout, due mostly to the fact there is no wasted aisle space.

In the layout all the departments are accessible, except the paint shop to which accessibility is not a feature, for when

a car goes into the paint department, it usually stays a week or two.

Skylights will have to be employed in both plans. The roof should be trussed across the entire space though in the smaller plan 50-ft. trusses could be used over the garage and shorter ones over the remaining section.

Either plan would accommodate your 50-ft. line shaft, but we believe it would be better to install the shaft across one end of the shop, grouping the machine tools on both sides rather than scattering them along a 50 ft. stretch. Also, grouping the machines leaves the remainder of the shop in better condition for body and chassis work.





1—Are you sure that the knock is caused by the spark? This knock may be due to worn pistons, causing piston slap or loose connecting rod bearing or loose wrist pin. If it is a connecting rod bearing knock it will be very noticeable when the engine is under a heavy pull. It may also be a result of carbon deposit or a sticky valve.

2—This advance in valve timing will result in poor running at low speeds and it will be impossible to throttle down. If the valve stems do not fit perfectly, the valve will spin and in all probability admit air and this will make it impossible to get a good carburetor setting.

3—Wiring diagram of the Overland 69, U. S. L. system appeared in the Feb. 19 issue of MOTOR AGE.

### AVERAGE VALVE TIMING

Q—Instruct how to time the valves on a gasoline car without knowing the firing order of the engine, when installing new camshaft and new timing gears?

2—When timing the ignition in what position should the piston and valves be, before setting brush or points?—W. L. Gamble, Tulsa, Okla.

1—Place the camshaft in any position and turn the engine over watching the order in which the intake valve on each cylinder opens and this will give you the firing order because the camshaft is built to operate the valves in only one order. The valve timing will have to be approximated or in other words an average setting will have to be adopted. An average valve setting would be as follows: the intake opens 9.5 degrees late and closes 37 degrees late; the exhaust valve opens 50 degrees early and closes 9 degrees late.

2—When timing the ignition the piston should be at top dead center which is when both valves are closed. The spark lever should be at the half way mark and the points set so that they are just beginning to open.

### ENGINE MISSES

Q—A model 83-B Overland car when moving along on the level misses badly but when pulling fires regularly. The magneto seems to deliver a good, hot spark and the valves have been ground recently. There is lots of compression. It seems to be the front and rear cylinder causing the trouble. Can you suggest a remedy?—F. W. Hill, Calumet, Minn.

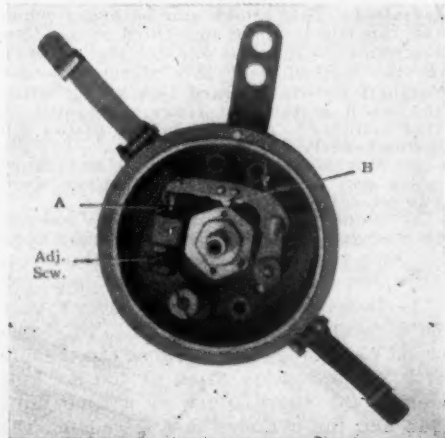


Fig. 2—Remy ignition distributor used on Paige, Brooklands model 51

To assist readers in obtaining as a unit all information on a certain subject MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

### THE ELECTRIC SYSTEM

G. A. Work.....Tiffin, Ia.  
A. M. Watson.....Atlanta, Ga.  
A Subscriber.....Texarkana, Ark.  
People's Garage.....Horse Cave, Ky.  
Harry Carlson.....Marquette, Neb.  
E. B. Epperson.....Humboldt, Tenn.

### ENGINES

Ed. J. Crawford, Kibler Auto Hospital.....Van Buren, Ark.  
W. L. Gamble.....Tulsa, Okla.  
F. W. Hill.....Calumet, Minn.  
Harry Hayner.....Sidney, Mont.  
J. E. Muchany.....Sedalia, Mo.  
Keith Marcellus.....Belvidere, Ill.  
A. V. Renwick.....Harrisonville, Mo.  
Vernon B. Kelly, Federal Garage & Service Station.....Brooksville, Fla.  
N. H. Hormal.....Oakdale, Pa.

### CARBURETION

G. E. Mercer.....Dallas, Tex.  
Frank Stephanski.....Grand Rapids, Mich.  
F. A. Work.....Tiffin, O.  
George H. Aitken.....El Paso, Tex.  
W. O. Shear.....Hillsboro, Wis.

### REBUILDING

Charles Seymour.....Whittemore, Ia.  
Hudson-Downs Motor Co.....Chillicothe, Mo.  
McKaig Bros.....Duncan, Okla.  
Herbert McClellan, Don Reiley's Motor Inn.....St. Joseph, Mo.

This is very likely due to improper carburetion or faulty ignition. It may be that the engine is getting too much gasoline or perhaps the mixture is weak when running at high speeds. Adjust the carburetor and examine the feed lines to see that they are not partially clogged. The contact screw in the magneto breaker box may need screwing up. The engine may fire all right at slow speeds or when the engine is under load

because the speed is slow enough and the contact is long enough to allow the coil to build up, but at high speeds the contact is too short. The coil may be defective. It would be advisable to inspect the magneto commutator as the fibre may be worn so that the roller touches on the high spots or it may be that the roller is worn out of round and consequently forms an imperfect contact on all of the points.

### ENGINE KNOCKS

Q—A 1916 Studebaker 4 has been recently overhauled. New pistons were installed. There is 65 pounds compression on all cylinders. The Schebler carburetor seems to be in good condition. The car has poor acceleration and knocks when the throttle is opened suddenly. It will not make over 35 m.p.h.

2—Should this car have a brake on the clutch spider and would the installation of one help in shifting gears?—Harry Hayner, Sidney, Mont.

1—This may be caused by poor carburetor adjustment but it is more likely to be too much advance of the spark. A thorough test will have to be made to locate the knock as there are many possible causes for it. Sometimes after an engine has been overhauled knocks develop as a result of a bent connecting rod or a loose wrist pin. One cylinder will get a slight lead, or one ring will not enter properly, cylinders are twisted and in an effort to align them the connecting rods are bent. If the wrist pins are loose it will always show up after an overhauling job of this kind. It is not impossible to believe that the knock may even be a result of a broken piston ring. Before going into the possibility of trouble due to the mistakes made in the overhauling, apply some of the tests

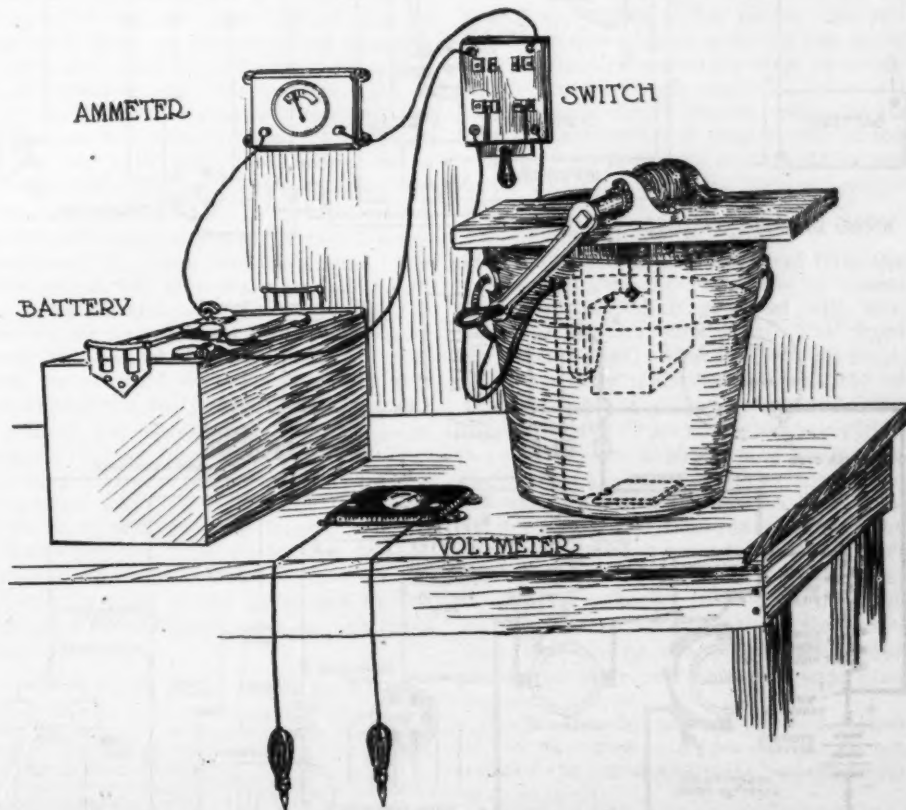


Fig. 3—Battery discharger made from a pail and old battery electrolyte. The current discharge is through the solution

for minor troubles and see if the knock can be eliminated. Test the spark to see if it is advanced too far; adjust the carbureter; see if the valve clearance is correct.

2—The clutch is made up of a stamped steel spider with a rim which is cone shaped. This cone is attached to the propeller shaft leading to the rear axle through two universal joints. A heavy spring is used to press it hard into the fitting section on the inside rim of the flywheel. The cone is faced with leather which grips the inside rim, and as the flywheel revolves with the crank shaft, the clutch and propeller shaft also revolve. Under the leather face of the cone shaped rim is a series of flat springs which allows the leather surface to engage less harshly with the inside rim of the flywheel. The clutch should work satisfactorily if it is properly taken care of. If the clutch slips, clean the facing thoroughly with kerosene and apply neatsfoot oil. If the clutch has been allowed to slip due to holding the foot on the clutch pedal it may be that the leather facing may be burned or worn so that the only remedy is a new leather.

#### LACK OF FLEXIBILITY

Q—A Mitchell C-42 car equipped with a Rayfield carbureter if gradually accelerated when traveling at slow speed will take hold O.K. but if in a traffic jam you

endeavor to get away it spits, snorts and if held, stops. Also, when running at an even rate of speed it works fine but on country driving where the speed varies from five to fifty miles an hour it does not work properly and engine overheats. We have endeavored to remedy the trouble but it doesn't seem to help. The gas line has been blown out, the vacuum drained, the valves reset, carbureter removed, cleaned and readjusted and the oil has been drained and changed every week. When running idle the engine "gallops" but on a steady pull the choker must be pulled out to get power. Can you suggest what is wrong?—Keith Marcellus, Belvidere, Ill.

The galloping at idling speed seems to indicate valve trouble. If the valves are not seating properly or if the valve stems do not fit close enough you cannot get a good carbureter setting. The valves may spin and permit air to come in directly which would cause galloping. The trouble may also be due to sticking valves. See that all of your manifold connections are tight and that the valves are in good condition and then you ought to be able to get good carbureter adjustment. It might be well to look at the oil pump to see that it is pumping the oil. The writer has had the experience of having the oil fail to function properly and the result was that one of the pistons froze and the connecting rod went through the crank case. If any of the parts show any signs of freezing

from lack of lubrication the engine will drag and it will be necessary to pull out the choke to keep it going. It is very likely that your trouble is due to carburetion or valve trouble and can probably be remedied by a careful adjustment of the carbureter. This lack of flexibility may be due to the fact that the auxiliary air intake is so constructed that it furnishes an abundance of air at high speed but is not sensitive enough at low. When the throttle is nearly closed the engine may stall or when it is suddenly opened there is no get away because the auxiliary air valve allows an inrush of air forming a mixture good enough for high speed but too weak for pickup purposes.

#### LOOSE BEARING

Q—A 1916 Case car model 35 has a distinct click in the magneto shaft, as if there was too much play in the gears. Can this be remedied in any way?

2—At slow speed, or when the above mentioned car is gaining speed or pulling there is a pound in the engine. What is the cause?—J. E. Muchany, Sedalia, Mo.

1—This is probably a case of worn timing gears and the only thing to do is install a new set. We have no blue prints in our files from which we can determine if there is any adjustment for the timing gears but this information can be obtained by writing to the Case company.

2—There are many factors that might cause this knock. Carbon, poor carburetion, faulty ignition, loose connecting rod bearing, loose wrist pin, worn pistons, timing gears, camshaft, worn valve stems and badly worn or broken piston rings are some of the factors that have to be looked over. It is very logical to believe that it is caused by a loose connecting rod bearing as a knock of this kind is always more noticeable at low speeds or when the engine is under a pull and the knock shows some signs of disappearing at high speeds. Check the engine for minor factors that might be causing the trouble and if the knock cannot be eliminated it will be necessary to make a careful inspection of the entire engine.

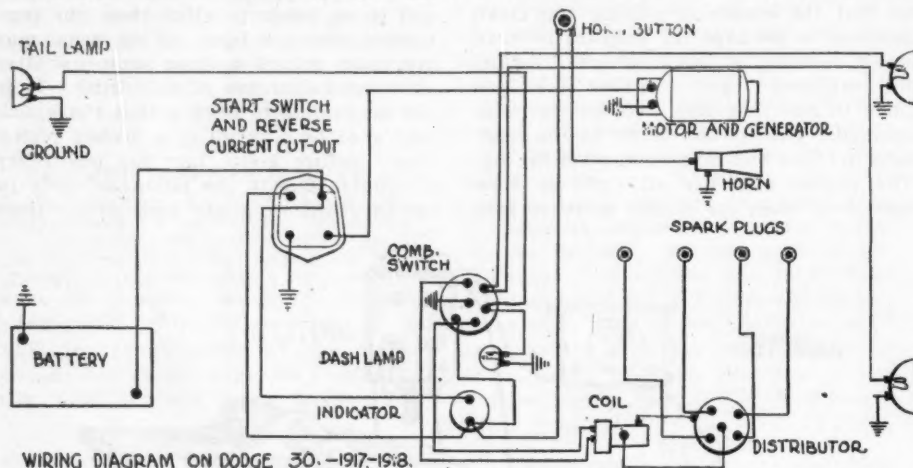
#### WRIST PIN KNOCK

Q—Since a Buick D-45 has been overhauled it has developed a knock. New pistons, pins, bushings and rings were installed. This knock can be heard when the throttle is about one-third open. The mechanic claims that one cylinder is worn at the bottom. If this were the case would I not have heard this knock when the worn piston and rings were still in this cylinder? Another says a piston pin is improperly fitted.

2—Would it be possible to get more miles per dollar if oversized tires were put on a Buick C 37.

3—Would it lessen the upkeep enough to warrant putting a light speedster body on this car?—A. V. Renwick, Harrisonville, Mo.

1—It seems as though the knock may be a result of the overhauling job. The wrist pin is very apt to cause the trouble if it is improperly fitted or loose. Pull one of the spark plugs at a time until you find the cylinder that is causing the knock and you will probably find a loose wrist pin. Often times a knock of this kind occurs as a result of a bent con-



WIRING DIAGRAM ON DODGE 30.—1917-1918.

Fig. 4

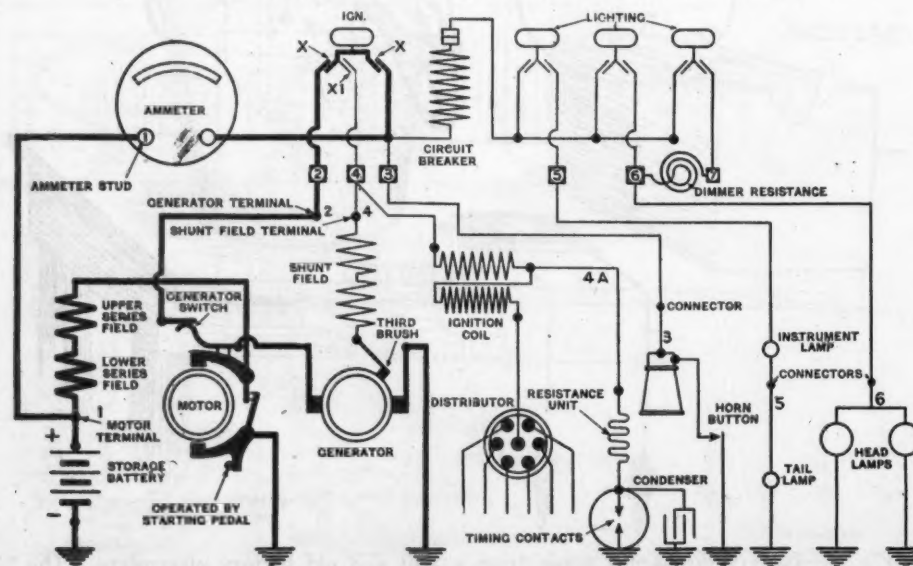


Fig. 5—Diagram of Delco connections on 1917 Hudson SuperSix



necting rod. The bending of the rod may be caused by heat or because the mechanics attempted to force it when aligning the pistons.

2—If you use oversize tires the riding qualities will be improved and it will be possible to get more mileage.

3—The change in body design would have very little effect on the cost of upkeep.

#### ENGINE MISSES UNDER LOAD

Q—A 1919 Studebaker which has run 15,000 miles started to miss badly. We ground the valves and adjusted the tappets to .006 and .007 also checked the timing and cleaned the carburetor but the engine still misses. It hits good when idle but on a load it misses badly.—Vernon B. Kelly, Federal Garage and Service Station, Brooksville, Fla.

The important question is, what kind of a miss is it? Does the engine load up or is the mixture so weak that the engine pops back through the carburetor? If the engine is loading the trouble is very apt to be caused by the vacuum tank. Failure to feed gasoline to the carburetor will allow gasoline to be drawn into the manifold directly and will load the engine causing it to miss while under heavy pull. This trouble may be caused by the flapper valve being out of commission, leaky float, manifold connections loose allowing air to be drawn into the manifold or gasoline strainer or tubing clogged. The first thing to do is to clean out the strainer and see that the entire gasoline feed line is in good condition. To determine if the vacuum tank is feeding gasoline to the carburetor, flood the carburetor, if gasoline runs out of the carburetor float chamber you can be sure that the vacuum feed is performing its work of feeding gasoline to the carburetor. Another test is to take out the inner vacuum tank leaving only the outer shell. If you fill this shell with gasoline and the engine still refuses to work properly, then the fault clearly lies elsewhere and not with the vacuum tank. A small particle of dirt may get under the flapper valve preventing it from seating and rendering the tank inoperative. In order to determine whether or not the flapper valve is out of commission, first plug up the air vent; then detach tubing from bottom of tank to carburetor. Start the engine and apply finger to the opening. If suction is felt continuously then it is evident that there is a leak between the tank and the main gasoline supply, or else the flapper valve is being held off of its seat and is letting air into the tank, instead of drawing gasoline. Many times this troublesome condition of the flapper valve can be remedied by tapping the side of the tank. If this does not prove effective it will be necessary to remove the inner tank. The flapper valve will be found screwed into the bottom of this inner tank.

This missing may be caused by faulty ignition. Go over the entire electrical and see that all of the connections are tight. Test the battery. Examine the spark plugs, see that the gap is correct and be sure that the distributor is in proper working order. If these tests when applied do not remedy the trouble

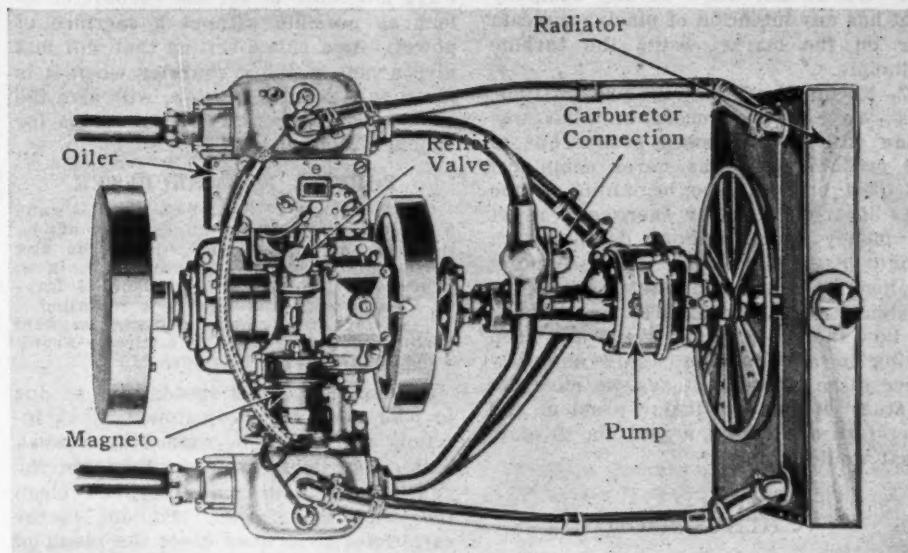


Fig. 6—Plan view of engine in the Autocar

it may be that the pistons and cylinders are worn so that compression is poor and oil is getting by the pistons and fouling the plugs.

#### HORSE POWER OF TRACTORS

In the March 18 issue of MOTOR AGE there appeared an answer to a question concerning the horsepower of two tractors: the Waterloo Boy and the Hart-Parr. Both of these tractors are of the same general type, and both have the same bore and stroke. At the test run at the Ohio demonstration, the Waterloo Boy tractor developed 21.5 hp. and the Hart-Parr tractor developed 37.5 hp. Not knowing that the Hart-Parr tractor was equipped with a manifold designed to introduce the mixture into the cylinder in the cold state, we answered the question saying that both tractors should develop approximately the same power. As a matter of fact, a manifold designed to introduce the mixture into the cylinder from the cold state will allow of a greater volumetric efficiency, because the mixture when cold is in more compact form, and being condensed in this fashion more will be drawn into the engine. For this reason the Hart-Parr tractor would have an advantage but probably not to the extent as indicated by the test. The poor showing of the Waterloo Boy tractor, we are told by the authorities who conducted the test, was definitely attributable to the condition the tractor was in before the test was made. It was discovered that the intake manifold of the Waterloo Boy tractor had a large air leak in it and that the tractor was an old one and not tuned up for any demonstration purposes, which accounts for the greater portion of the difference in the horsepower developed by these two tractors.

#### AUTO CAR ENGINE

Q—Will a two cycle engine running at the same speed with the same bore and stroke deliver as much power as an engine of the four cycle class?

2—Publish illustration of the 2-ton Autocar engine.

3—Explain the double reduction drive on the Autocar.

4—Could fuel oil be used to generate steam in the Stanley steamer?

5—How is the water and fuel controlled in the Bryan steam powerplant? Show a cut of this powerplant.

6—Is there any steam car under construction using the turbine instead of the engine to drive it?

7—Have you any information on the car the Pittsburgh Gearless Corp. will put out?

8—Was the steam powerplant for airplanes that was designed for the government ever tried out? If so, how could an airplane fly upside down using a steam powerplant?—N. H. Hormel, Oakdale, Pa.

1—The characteristic feature of the two cycle engine is that there is an explosion in each cylinder during every down stroke of the piston, instead of during every second down stroke, as in the four cycle engine. This means that you have two power strokes in the two cycle engine to every one in the four cycle engine. The two cycle engine is built and used extensively in marine work but its use for automobile is limited and at the present time there are no manufacturers using this type of engine for automotive work.

2—Shown in Fig. 6.

3—The drive is communicated from the transmission to the rear axle by means of a propeller shaft provided with universal joints at each end. The front end of this shaft slides in the front joint. The rear axle contains a double set of gears. A bevel pinion, connected with the end of the drive shaft, meshes with a bevel gear, on a short jack shaft, and thus drives the latter. This in turn drives the differential case through a pair of large spur gears. The inner ends of the two live axles are mounted in the differential case and transmit the drive from it to the wheels. The jack shaft is mounted on adjustable taper roller bearings, and means are provided whereby it can be examined without dismantling the axle proper.

4—The Stanley power plant is designed to use kerosene as a fuel and we do not believe that it works very satisfactorily with fuel oil.

5—We have no information on the Bryan Steam Car.

6—We do not know of any company that has any intention of placing a steam car on the market using the turbine principle.

7—No information at the present time.

8—We have no record of what was done with the proposed design but in all probability it was never completed or tried out. At the beginning of the war if you remember there was a lot of money spent without developing a single plane that was fit for use and it is logical to believe that this type of design was discarded. The question as to how the power plant would act when flying in any position would naturally have to be worked out and we have not a study of this particular problem and therefore are not in a position to state what would happen.

## Carburetion

### STROMBERG ADJUSTMENT

Q—Instruct how to adjust the model MB Stromberg carburetor used on the 1918 Briscoe.

2—It seems to operate better on cold days. It had hot air connections. Explain how to determine the correct adjustment for all occasions.—G. E. Mercer, Dallas, Tex.

1—According to our records the Stromberg carburetor was not standard equipment on the 1918 Briscoe cars. A cut of the carburetor is shown in Fig. 8. There are two adjustments on this carburetor: A, the main adjustment, controls the gasoline supply from the float chamber and regulates the mixture through the whole driving range. Turning the nut A anti-clockwise, or to the left, raises the needle and gives more gas; clockwise less. If an entirely new adjustment is necessary, turn nut A clockwise until the needle just seats, then open A three complete turns, which should give a rich mixture. After the engine is warmed up this adjustment can be changed to meet driving conditions. The gasoline for idling is taken in above the throttle and controlled by dilution with the air from the inside of the carburetor, as regulated by screw B, which should be between  $\frac{1}{2}$  and  $1\frac{1}{2}$  turns to the left from the seating position. During warm weather the adjustment shutter on the air horn should be opened to admit the cold air.

2—In adjusting a carburetor it is al-

ways advisable to set the carburetor as lean as possible without a sacrifice of power. As a rule a setting that will just give a pop in the carburetor when it is given full throttle quickly, will give the most satisfactory running conditions for summer weather.

### POPPING IN CARBURETOR

Q—When a 1917 Studebaker car is running at high speed, about 30 to 35 m.p.h., it spits and misses. It will not do any better than 35 m.p.h. The engine is in good condition, and a new model G Rayfield carburetor has just been installed.

2—What mileage should this Rayfield carburetor give? I get 10.4 m.p.g.—Frank Stephanski, Grand Rapids, Mich.

1—Missing at high speeds may be due to poor carburetor adjustment, weak ignition which may be caused by a weak battery, or leaky valves. Examine the gasoline feed line carefully and clean the whole system out. Popping in the carburetor is in most cases the result of too weak a mixture which may be caused by improper carburetor adjustment or a partially clogged gasoline feed line.

2—This car should get about 12 to 14 m.p.g. of gasoline under average conditions.

### RAYFIELD ADJUSTMENT

Q—Give complete instructions to adjust the Rayfield carburetor on the Paige Brooklands, 51.—F. A. Work, Tiffin, Iowa.

The carburetor has only two adjustments, one for low speed and one for high speed. Always adjust the carburetor with the dash control plunger

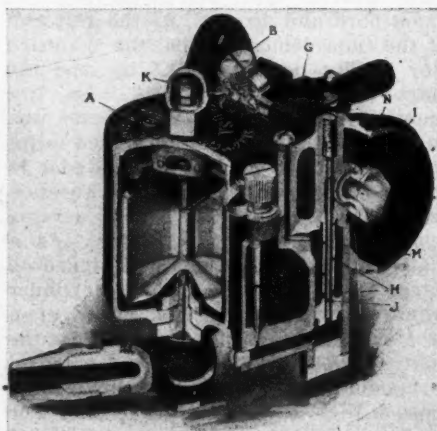


Fig. 8—Sectional view of Stromberg carburetor used on Briscoe

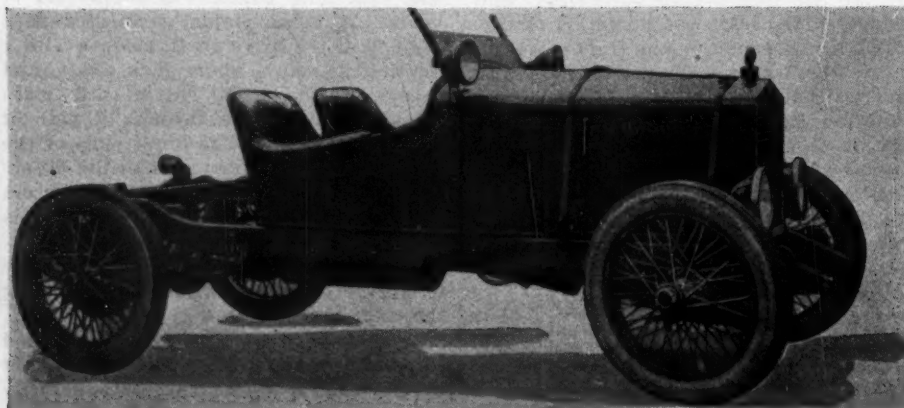


Fig. 7—The Essex roadster that ran in the recent fifty-hour endurance run

down. The low speed adjustment should be turned to the right or left as required until the engine runs properly at idling speed. The high speed adjustment is made accessible by removing the hollow air elbow from over the main air valve. Do not move the high speed screw more than one-eighth of a turn at a time. Turn it to the right for a richer mixture and to the left for a leaner mixture. This setting will greatly determine the fuel economy and therefore the setting should be as lean as possible without sacrificing power and acceleration. An illustration showing the location of the adjustments was published in the June 24 issue of MOTOR AGE.

### LACK OF FLEXIBILITY.

Q—Have a 1915 Dodge that has been run about 17,000 miles. New Munger rings were installed a year ago. There is about 55 to 60 lbs. compression on all cylinders. The valves are clean and were ground less than 3 months ago. The vacuum feed seems to be O.K. with pipes free. A new metering valve and float valve were installed a short time ago. It is equipped with a Stewart carburetor and I get 15 m.p.g. where I formerly got 18 to 20 m.p.h. The engine lacks pep and power. You can run along say at 15 m.p.h. very nicely, giving plenty of gas and instead of picking up, the engine will slow down and begin to labor and seems as though there was a shortage of gas. Drop into second and away you go. Again strike a medium grade at 20 m.p.h. and shortly the engine slows down and seems to lack gas power. New Dodge Titian plugs are installed none of them foul except No. 4 which soots up a little. The Eiseman magneto gives a good spark to all plugs.—George H. Aitken, El Paso, Tex.

Your description seems to indicate that the carburetor is out of adjustment. The one important adjustment of this carburetor is the proportioning of the volume of gasoline to the air admitted. The air being always a fixed factor it is only necessary to adjust or regulate the volume of gasoline admitted which is controlled by the tapered metering pin. The adjustment should be made at an idling engine speed. This lack of flexibility is due in 99 cases out of a hundred to carburetor trouble and the only way it can be overcome is by a very careful carburetor adjustment.

### MARVEL CARBURETOR

Q—In the description of the Marvel carburetor which appeared in the May 6 issue of Motor Age, you tell of a diamond shaped shutter on this carburetor that should be open in warm weather to allow the hot exhaust gas to escape before it overheats the nozzle. I have been unable to locate this shutter on the Marvel carburetor with which my 1920 Nash car is equipped. The Nash dealer can't find it either. Kindly advise just where the shutter is.—W. O. Shear, Hillsboro, Wis.

The valve referred to is usually controlled from the dash. The dash adjustments are usually marked choke, hot and cold. When the lever is set to the choke position both the hot and cold air inlets are shut off and only enough air is permitted to enter to make a combustible mixture at a low temperature. When the adjustment is set to hot the air supply comes from the chamber around the exhaust manifold and the resulting mixture is very satisfactory while the engine is warming up. When the adjust-



ment is turned to cold the air is drawn in from the outside and if the carbureter is properly adjusted gives the right mixture for ordinary driving temperatures. Of course in hot weather it is advisable to drive at the cold position at all times because the outside air is very warm and the use of the exhaust in addition to this would prove very unsatisfactory.

## Rebuilding

### SPEEDING UP BUICK

Q—A Buick E 6-44 which has been driven about 10,000 miles works perfectly at all speeds from 2 to 45 m.p.h. but will go no faster. This car made 63 m.p.h. when new. A new timing gear was installed and the key slot in one gear was cut in such a way that it made the valve timing a little slow according to the marks on the flywheel but car worked fine, pulled good and keeps cool but 45 m.p.h. is the limit. Recently noticed in Motor Age an article regarding changing the valve timing so as to set the valves one tooth ahead which makes the intake open about one-half to three-quarters of an inch ahead of the mark on the flywheel. The engine seems if anything, to work better at slow speeds but is not faster than it was before. Changing the carbureter does not seem to affect it much. Give the proper setting for high speed. Suggest a way to increase the speed of this car without any radical change such as enlarging valve ports or changing gear ratio.

2—What is the highest speed this car should go under favorable conditions?

3—Is it possible that the speedometer does not register correctly at high speed?

4—Would setting the valve timing one tooth ahead do any good? The valves, pistons, rings and cylinders are all in first class shape. The compression is good and the same on all cylinders. Tappets are adjusted to the proper clearance.—Chas. Seymour, Whittemore, Ia.

1—Increased speed may be obtained by setting the spark a little advanced. In a great many instances the ignition is timed far too slow and the result, obviously, is lack of speed. The installation of lighter pistons and connecting rods ought to increase the speed considerable. If the valve timing is advanced one tooth the engine will be somewhat faster but it will not idle well.

2—The writer has driven one as high as 56 miles an hour and if the car you have ever made 63 miles per hour it must have been tuned up in pretty good shape.

3—In many cases the speedometer does not register correctly at high

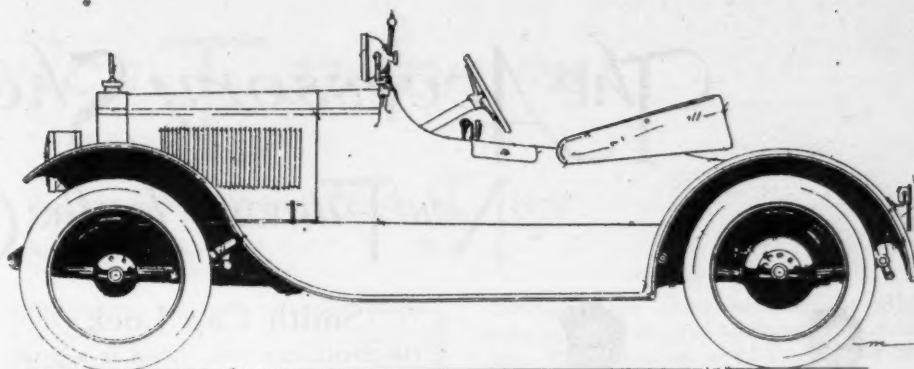


Fig. 10—Design similar to Stutz Bearcat body, for application to Essex car

speeds but there should not be as much as 10 miles per hour difference.

4—Setting the valve timing ahead one tooth will undoubtedly give you more speed, but we do not think this should be necessary. When the carbureter is properly adjusted and the ignition is properly timed this car should make about 55 miles per hour with ease.

### ADJUSTING OAKLAND REAR END

Q—Publish design for body similar to the Stutz bearcat to be used on an Essex chassis.

2—Publish illustration of the Essex that ran in the 50 hour endurance run.

3—Instruct how to take play out of the rear end of an Oakland Six.—Hudson-Downs Motor Co., Chillicothe, Mo.

1—Shown in Fig. 10.

2—Shown in Fig. 7.

3—This play is probably caused by the driving pinion and ring gear being out of adjustment. The drive pinion is mounted in two ball-bearings, the whole being mounted in what is known as the third member housing. This assembly is bolted to the differential housing. To adjust the driving pinion and ring gear loosen the lock which holds the front bearing sleeve in front end of third member and by turning the bearing sleeve to the right the driving pinion moves toward the ring gear, thereby taking up any back lash in the teeth of the two gears; turning the bearing sleeve to the left withdraws the driving pinion from the ring gear causing more clearance between the gear teeth. This adjustment can be made without removing the rear end universal joint. To remove the entire third member assembly it is necessary to disconnect rear universal joint

and remove the several nuts and lock washers from studs in the rear axle housing. If there is play in the wheels it can be taken up by turning up the nut which you will see after removing the hub cap. If the entire axle shaft can be moved back and forth the trouble may be due in some measure to worn end thrust bearings. Refer to Fig. 6, page 39, June 3 issue of Motor Age. This may be remedied by the installation of thrust washers. No adjustments of the differential are required.

### HOISTING CRANE

Q—Give suggestion for making a hoisting crane on a 1-ton Ford truck. Would like it so the engine can be lifted out of tractor and placed on Ford bed so it can be hauled to town and repaired.—McKaig Bros., Duncan, Okla.

Shown in Fig. 9. The details of this crane will have to be worked out according to the material you have to work with. From the illustration you can get the relative proportions and obtain the necessary material for its construction.

### SPEEDING UP DODGE

Q—Had a racer built this winter for use in dirt track races. It is a Dodge car with Hudson supersix valves installed Lyande oversized pistons and each piston is 1 1/4 lbs. lighter. It has a 92 in. wheelbase and is underslung so that the crankcase is about 6 in. from the ground. How can the speed be increased without installing a larger gear? It will do 75 m.p.h. now.—Herbert McClellan, Don Reley's Motor Inn, St. Joseph, Mo.

If you intend to use this car for dirt track racing the gear ratio should be about three to one. The valve timing can be advanced but that is about the only thing that can be done that you have not already done. If possible it would be advisable to install a high speed camshaft and one that would increase the valve lift. The ignition timing can be altered to secure greater speed and the installation of a carburetor to meet racing conditions would also be a great asset.

### HUB CAP LEAKS

Q—How can the oil seepage around the rear hub cap be prevented on a 1913 Cadillac still having them properly lubricated?—Lee W. Snyder, Macon, Ga.

If there is oil seepage through the hub caps it is evident that the cap is not tight or the threads are stripped. If the threads are causing the trouble we advise using a new hub cap.

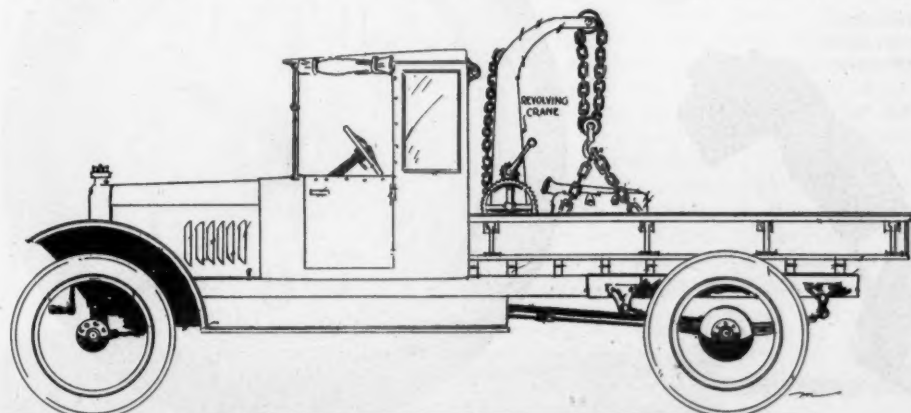


Fig. 9—Suggestions for hoisting crane on Ford chassis

# The Accessory Show Case

## New Fitments for the Car



Duster coat which can be transformed to trousers

### Clox-Lite Automatic Lighting Switch

The Clox-Lite automatic lighting switch is an attachment that will convert any clock to which it is applied, into a time switch. This device being mounted in its entirety on a clock crystal makes it unnecessary to disturb the clock's mechanism. This instrument is very neat in appearance and easily installed on any car. It is manufactured by the Fox Light Mfg. Co., 24 Scott St., Newark, N. J., and the price is \$3 and up.



Marvel measure with flexible spout

### Smith Cap Lock

The Smith cap lock shown is a product of the O. P. Smith Co., 205 W. Harrison St., Chicago, and is a lock to be applied to the radiator cap of automobiles. It is designed to aid in preventing the theft of motor meters, thousands of which are stolen every year. The lock consists of a small bolt which is passed through the cap and radiator nickel and locks on the inside, the lock being done by means of a key. It is of a simple construction and easily installed in any car using a screwed on radiator cap. When the lock is drawn from the hole it remains on the key, and the key cannot be withdrawn from the lock until the bolt is set in the locked position.



Smith radiator cap lock

### Marvel Measure

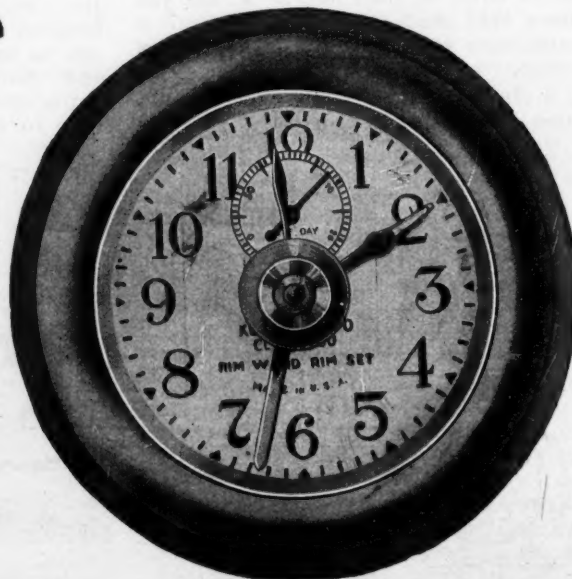
The measure shown is for dispensing lubricating oils. It is a one quart flexible measure and eliminates spilling; keeps oil from dripping on the automobile. It is not necessary to use a funnel with this measure. It is made of heavy tin, the ferrule is brass. The Marvel measure is a product of the P. R. B. Pump Co., Inc., Hannibal, Mo.

### Duster Coat

The duster coat has the novel advantage of being made into a pair of trousers by bringing the coat-tail forward around the legs and fastening it in front. The coats are manufactured by the Ohio Garment Co., Springfield, O.

### Woodworth Lubricating Spring Covers

The Woodworth lubricating spring cover is a coupling for leaf spring of automobiles and is made of oil and water-proof material, having a felt wicking on the inside which is saturated with oil before the covers are put on. The covers inclose the springs from the u-bolt clamps at the thick part of the spring to the thin end. They not only keep the springs well lubricated but keep out all moisture and dirt. The covers range in price from \$3.50 per set to \$17 per set. They are manufactured by the Woodworth Mfg. Corp., Niagara Falls, N. Y.



Clox-Lite automatic lighting switch



# Service Equipment

## Time Savers for the Shop

### Dow Stock and Display Rack

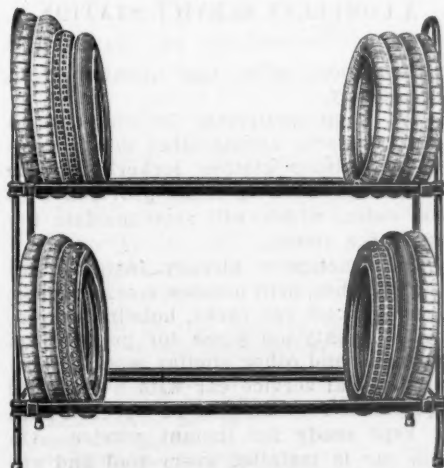
Proper display always adds greatly to the possibility of sales. Therefore, it is good business to keep the products clean and presentable at all times and displayed to the best advantage. The display rack shown is a double deck rack 6 ft. 3 in. long, 6 ft. 6 in. high and is finished in black enamel. It will add to the neatness of your display room and enable you to keep the tires as they should be kept. The Dow Wire & Iron Works, Louisville, Ky., list this rack at \$12.

### Continental Piston Vise

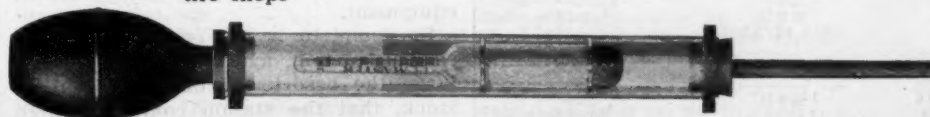
The Continental piston vise is a universal tool for handling all sizes of pistons from  $2\frac{3}{8}$  to 5 in. in diameter. It is quick acting and adjustable. The jaws are lined with leather, which gives it a velvet grip and holds the piston firmly, yet without danger of injuring the surface. This vise is manufactured by the Continental Auto Parts Co., Columbus, Ind.

### Apco Valve Grinder

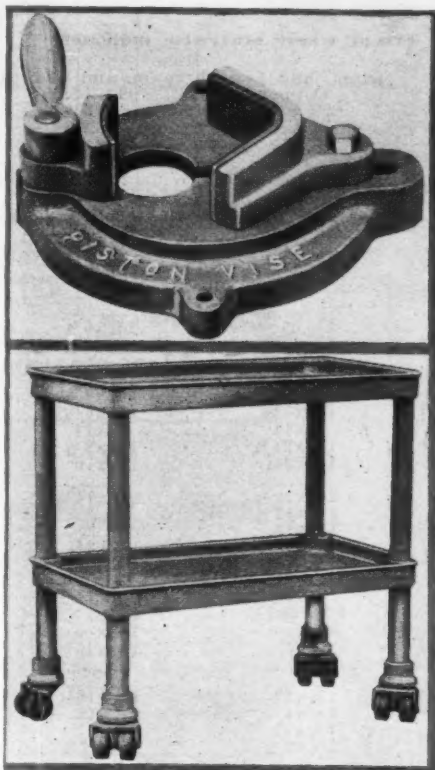
The valve grinder is a handy device for the service station mechanic or the car owner who makes his own repairs. In this grinder the spring points hold the valves securely so it can be raised from its seat while grinding. It measures 12 in. over all and weighs 8 ounces. This grinder is manufactured by the Apco Mfg. Co., Providence, R. I.



Dow stock and display rack for tire shops



Master hydrometer syringe



Top—Continental piston vise, and below, parts and tool tray

### The Master Hydrometer Syringe

The Beckley-Ralston Co., Chicago, has placed a new type of hydrometer on the market. The Master hydrometer syringe, as this new instrument is called, is built on entirely new principles. Working along the line that the principal fault of the ordinary hydrometer lies in the tendency of the float to tip against the sides of the glass tube and stick, they have eliminated this feature in the construction of the new tester shown in the illustration. Celluloid rings, with projecting guide fingers, are attached to the float. Resting lightly against the sides of the test tube they hold the float erect and enable it to ride freely. It is a known fact that when the float tips against the glass tubing its ability to ride freely is hampered considerably by capillary attraction. In ordinary hydrometers it can easily be understood how the float

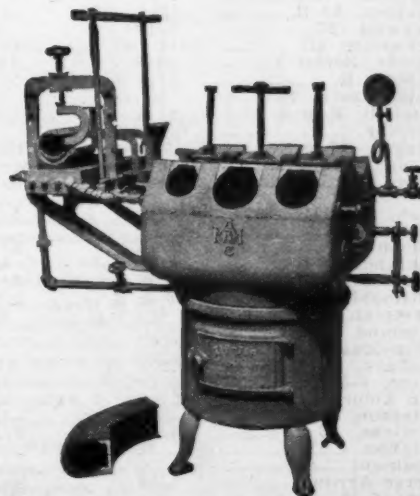
resting at an angle against the glass tube is liable to give an inaccurate reading. The glass barrel of the Master hydrometer is large, heavy glass and the sides are absolutely straight.

### Continental Parts and Tool Tray

The Continental parts and tool tray represents one of the handiest devices for the garage and service station. It is substantially constructed and mounted on large double wheel castors and can be very readily moved to the place desired. In the assembly and disassembly of automobiles, trucks, tractors and their component parts, this portable bench will prove itself to be almost indispensable. The top is of solid metal and parts can be washed in the tray. By moving set screws in the lower pan, the height of the lower pan can be adjusted to suit your requirements. This tray is a product of the Continental Auto Parts Co., Columbus, Ind.

### Vulcanizing and Retreading Machine

The vulcanizing and retreading machine shown is known as the improved type A and is the product of the Akron Rubber Mold and Machine Co., 1919 Sweitzer Avenue, Akron, O. This machine was recently developed to take care of the large number of Ford tires now needing repair. It is a three cavity outfit, accommodating all makes of Ford and fabric tires up to five inches. It is equipped with tube plate and self-contained steam boiler.



Tip-top vulcanizing and retreading machine

# TUBING AND HOSE SIZES

## For 1919 Cars

### Motor Age Maintenance Data Sheet No. 103

One of a series of weekly pages of information valuable to service men and dealers—save this page

Car and Model	Inside diameter measurements given except where otherwise indicated		Hose	
	Gasoline Tubing Diam.	Oil Tube Diam.	Diam. and Length (Upper)	Diam. and Length (Lower)
Allen, 43	3/4		2 1/2 x 6	2 x 2 1/4
American				
Anderson, all	3/4	.311	1 1/2 x 12	1 1/4 x 10
Apperson, 8-19	5/16	1/2	3 x 12	2 x 9
Argonne				
Auburn, 6-39 H.	5/16	1/4	1 1/4 x 2	1 1/4 x 12 1/2
Beggs, 19	1/4	1/2	1 1/4 x 12	1 1/4 x 12
Biddle				
Bour-Davis, 20	5/16 OD	1/4 OD	1 1/4 x 11	1 1/4 x 11 1/2
Brewster				
Briscoe, 4-24	3/4	1/4	2 x —	2 x —
Buick, H-45, K-45	5/16			
Cadillac				
Case, V-19	5/16 OD	5/16 OD	1 1/2 x 9	1 1/4 x 6 3/4
Chalmers, 6-30	19/64	1/8	2 1/2 x 5 1/4	{ Short—2 1/4 x 3 Long—2 1/4 x 4 1/4
Champion				
Chandler	5/16 OD	1/4 OD	2 1/4 x 10	2 1/4 x 14
Cleveland, 40	5/16 OD	3/8 - 1/4 - 1/8 OD	1 3/8 x 11 3/8	1 3/8 x 9 3/8
Climber, T-4-40	3/4		1 1/4 x 3 1/2	1 1/4 x 6 1/2
Cole Aero Eight	3/4	1/4	2 x 11	2 x 14
Columbia, all	.032		1 1/2 x 21 3/4	1 1/4 x 3 3/4
Comet			1 1/4 x 2 1/4	1 1/4 x 10
Commonwealth, 41	3/16	None	2 1/4 x 12 1/2	2 1/4 x 14 1/2
Crow-Elkhart, K-36	3/4		2 1/4 x 12 1/2	
Crow-Elkhart, K-46	3/4		1 1/2 x 12	
Cunningham	5/16 OD	5/16	1 1/4 x 5 1/2	1 1/4 x 3 3/4
Daniels, B.	3/4	3/16	1 1/4 x 7 1/2	1 1/4 x 6 1/2
Davis, all	5/16 OD	1/4 CD	1 1/4 x 11 & 1 1/4 x 12 1/2	
Dixie Flyer, H, Ser. 50	.2375	.2375	2 x 14	2 x 14
Dodge Brothers	3/4	3/8	1 3/16 x 7 1/4	1 1/2 x 7
Dorris, 6-80	5/16 OD	5/16 & 3/8	1 1/2 x —	1 1/2 x 7
Dort, 8 & 11	.18	.36	2 1/4 x 7	2 1/4 x 15 1/8
Economy				
Elcar				
Elgin	5/16 OD	1/4 OD	1 1/2 x 7 1/2	1 1/2 x 15 1/8
Essex, A	5/16	5/16	2 1/2 x 4	2 1/4 x 14
Ferris, C-20	3/4	3/8	1 1/2 x 13	1 1/4 x 11
Ford, T	3/16	5/16	1 3/4 x 2 3/4	1 3/4 x 2 3/4
Franklin, Series 9	.18	.18		
Geronimo	3/4		1 x —	1 1/4 x —
Grant, GX	.256	.193	1 3/4 x 7 3/4	1 13/16 x 3 3/4
Harroun, AA1	3/4	5/16	2 x 2 3/4	2 x 4 1/4
Harvard				
Hatfield, A	7/32	5/32	2 x 12	2 x 15
Haynes, 45	3/4	3/4	1 1/4 x 7	1 1/2 x 4 1/2
Haynes, 47	3/4	5/16	1 1/4 x 7	1 1/4 x 2 3/4
Holmes	1/4 OD	1/4 OD		
Hudson, M	3/4	3/4	1 1/2 x 3 3/4	1 1/2 x 9 1/4
Hupmobile, R	3/4	7/16	2 1/4 x 10 3/8	2 x 9 1/16
Jones, 27	5/16	1/16	1 1/2 x 6	1 1/4 x 7 1/2
Jordan, F	3/4	3/16	1 1/2 x —	1 1/4 x —
King, G	.2625	.200	2 1/4 x —	1 3/4 x —
Kissel Custom Built	3/4	3/4	1 1/4 x 8 3/8	1 3/4 x 9 11/16
Klinekar, 6-42, Ser. H	5/16 OD	1/4 OD	1 1/4 x 10 1/2	1 1/4 x 13
Lexington				
Liberty, 10-B	3/4	3/8	2 1/4 x 6 3/8	2 1/4 x 9 3/8
Locomotive, M-48	.270		.416 x 8 1/16	.416 x 2 15/16
Lorraine, 20-T	3/16	3/16	2 x 9 1/2	2 x 16 1/2
Malibohm, B	3/4	3/16	1 1/2 x 6 3/8	1 1/2 x 13
Marmon, 34-B	.291	.291	1 1/4 x 3 3/8	1 1/4 x 3 3/8
Maxwell, 25	3/16	3/4	2 1/2 x 6 1/4	2 1/2 x 7 3/4
McFarlan, all	5/16 OD	5/16 OD	2 x 8	1 1/4 x 5
Mercer, Series 5	.2485	.2485	1 11/16 x 8 3/8	1 3/16 Elbow
Meteor, R	5/16	5/16	1 1/2 x 4	1 1/2 x 4
Metz, Master Six	3/4	3/4	1 1/2 x 14	1 x 12
Mitchell, E 40 & 42	3/16	5/16	1 1/2 x 8 1/2	1 1/2 x 8
Monitor				
Monroe, S 7 & S 8	15/64	15/64	2 x 5 1/2	1 3/4 x 15
Moon, Victory	5/16 OD	1/4 OD	1 1/4 x 10	1 1/4 x 12
Moore, F	5/32	5/32	1 1/4 x 7	1 3/4 x 7-G. B. S. eng.
Nash, 681-2-4-5-6-7	5/16	5/16	2 x 7	1 1/2 x 16-Own eng.
National			1 1/2 x 7	1 1/4 x 4
Nelson	3/16	5/16		
Oakland, 34-B	3/16	1/4	1 1/2 x 8	1 1/2 x 8
Oldsmobile, 37-A	3/16 & 1/4	3/16	1 1/2 x 15	1 1/4 x 16 1/4
Oldsmobile, 45-B	3/16 & 1/4	3/16	1 1/4 x 16 3/4	1 x 11 1/2
Olympian, 45	3/4	3/4	1 3/8 x 14 3/4	1 1/4 x —
Overland			2 x 6	2 x 8 3/4
Owen-Magnetic				
Packard, 325 & 335	.277	.152	1 1/2 x 8 1/16	1 1/2 x 8
Paige, 6-55	5/16	5/16	1 3/4 x 9 1/2	1 1/4 x 12
Pan American, 6-48	5/16	3/4	1 1/2 x —	1 1/4 x —
Paterson, 6-47	3/4	3/4	1 1/4 x 10	1 1/4 x 14 1/2
Peerless, 56	5/16	5/16	2-1 13/32 x 7	1-1 21/32 x 5 1/2
Phianna				
Piedmont				
Pierce-Arrow	5/16			
Pilot, 6-45	3/4	1/4 & 5/16	1 1/2 x 10	1 x 6
Premier, 6-C	5/16 OD	5/16 OD	1 1/2 x 5 1/4	1 1/4 x 8 3/4

(To be continued next week)

## WHAT YOU SHOULD KNOW ABOUT PAINTING CARS

(Concluded from page 18)

some few scattering paint shops throughout the country, but not near enough of them to take care of all the work, and the only reason why the average garage man has not added this service feature to his work has been his belief that expensive equipment and long training were necessary before he could get into the work. He also has Mr. Dubb's experience in mind and thinks that good work can be done in the small town equally as well as in the large one. It is not a matter of location, but entirely a matter of knowing how. Any garage man or other interested person can profitably take up this work, and learn it in a short while.

Not only is there a scarcity of automobile paint shops, but there is also an ever-increasing lack of skilled painters. There are plenty of men who are desirous of learning the trade, but no adequate facilities have ever been provided for training these men and making experts of them. Factories and paint shops feel this shortage keenly, and all know that the skilled painter is a better paid workman than the mechanic. One dollar an hour is an average wage for them in Chicago, right now, the off-season, and on a piece-work basis, I know of some that are getting as high as \$96 a week for forty-nine hours' work.

There will soon be some seven million cars on the highways of the United States, and the demand for service on paint and varnish, as well as new work, is getting stronger every day.

Automobile painting consists of three main operations and a variation of these three will take care of every known type of work. Contrary to the general belief, automobile painting does not consist only of an expert knowledge of how to handle brushes. It consists mainly of an expert knowledge of materials, their uses and purposes.

## A COMPLETE SERVICE STATION

(Concluded from page 15)

tion in both price and quantity from day to day.

The shop equipment is complete in every respect; among other things it includes private clothes lockers for the men, large wash-up sinks provided with hot water, which will accommodate ten men at a time.

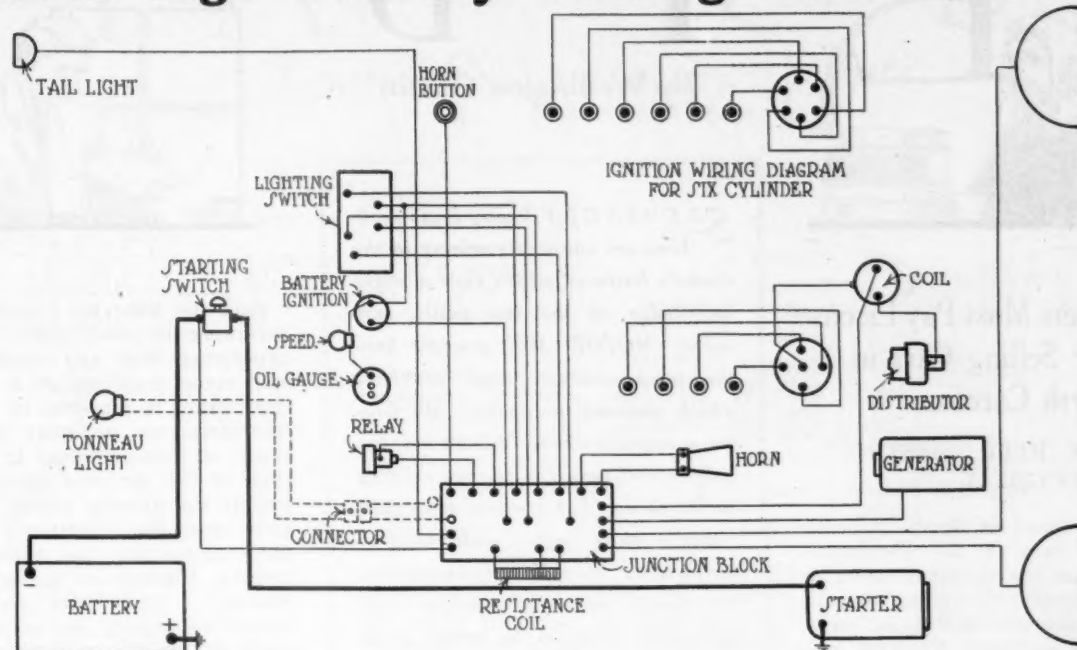
The machinery already installed includes lathes, drill presses, emery wheels, special motor car racks, hoisting cranes, and a twenty-ton press for pressing on bushings and other similar work.

A special service car with a complete equipment for handling of wrecked cars is kept ready for instant service. On this car is installed every tool and apparatus necessary in any emergency and the shop has no more valuable piece of equipment.

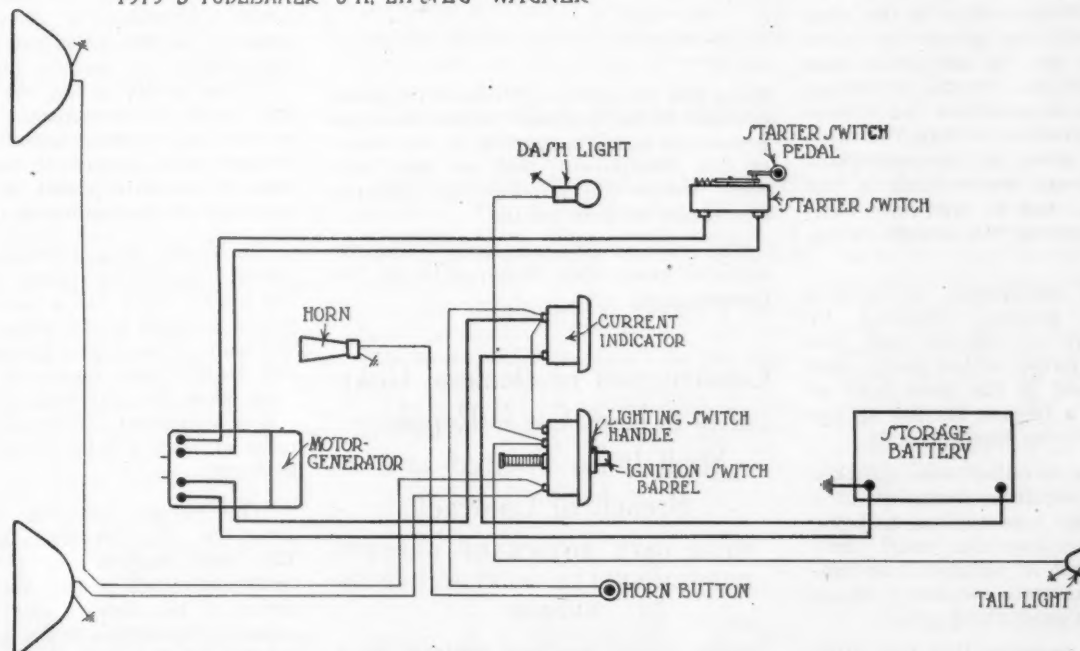
So complete is the equipment of the service station machine shop, and so large the assortment of parts kept in stock, that the station could well-nigh assemble a complete car without any outside help.



# Motor Age Weekly Wiring Chart No. 84



1919 STUDEBAKER J.H. EH &amp; EG WAGNER



1918-1919 DODGE NORTHEAST SYSTEM

Name of car and date on which wiring diagrams have appeared in previous issues

Allen—Dec. 18, '19; June 17, '20  
 Auburn—Nov. 27, '19; April 1, '20  
 Briscoe—May 6, '20  
 Cadillac—April 22, '20  
 Chalmers—Nov. 27, '19; June 17, '20  
 Chandler—May 20, '20  
 Cole—June 10, '20  
 Crow-Elkhart—April 22, '20  
 Cutting—Nov. 6, '19  
 Daniels—Dec. 4, '19  
 Davis—Dec. 4, '19  
 Dixie—April 1, '20  
 Dodge—April 15, '20  
 Dorris—Dec. 11, '19  
 Dort—March 25, '20  
 Elcar—May 6, '20  
 Franklin—Dec. 11, '19; June 3, '20  
 General Battery Charging—Sept. 15, '19

General Magneto Diagram—June 5, '19  
 Grant—April 29, '20  
 Haynes—June 24, '20  
 Hupmobile—May 27, '20  
 Internal Connections—July 10-17-24, '19  
 Jeffery—May 13, '20  
 Jordan—June 10, '20  
 Keeton—Nov. 6, '19  
 King—May 20, '20  
 Kissel—May 27, '20  
 Lexington—Jan. 1, '20  
 Liberty—Jan. 1, '20  
 Locomobile—June 6, '20  
 Marmon—Dec. 25, '19; Jan. 22, '20  
 Mercer—Nov. 27, '19; March 25, '20  
 Mitchell—Jan. 8, '20  
 Moline-Knight—May 20, '20  
 Moon—Jan. 29, '20; March 11, '20  
 Moore—March 4, '20  
 Nash—March 11, '20  
 National—Feb. 12, '20  
 Oakland—April 15, '20  
 Oldsmobile—April 8, '20

Olympian—Jan. 22, '20  
 Packard—March 18, '20  
 Paige—July 3, '19; April 20, '20  
 Peerless—May 13, '20  
 Pierce-Arrow—Feb. 5, '20  
 Pilot—March 4, '20  
 Premier—Dec. 18, '19; Feb. 26, '20  
 Reo—Nov. 13, '19  
 Roamer—March 18, '20  
 Saxon—April 8, '20  
 Scripps-Booth—Jan. 15, '20  
 Stearns-Knight—Jan. 8, '20  
 Stephens—Feb. 12, '20  
 Studebaker—Dec. 25, '19  
 Stutz—Feb. 5, '20  
 Templar—Jan. 29, '20  
 Velle—Feb. 19, '20  
 Westcott—Jan. 15, '20  
 White—Feb. 19, '20  
 Willys-Knight—Feb. 26, '20  
 Special Systems for Fords—May 15-22, '19

# Law in Your Business



By Wellington Gustin



## Manufacturers Must Pay License Tax for Selling Cars in North Carolina

### STATUTE HELD CONSTITUTIONAL

The Supreme Court of North Carolina, in the license case of the Bethlehem Motors Corp. and the National Motor & Vehicle Co. against two county sheriffs of North Carolina, who had levied on a Bethlehem truck and on a National motor car, for non-payment of the license tax for selling automobiles in the state under its statutes, has upheld the validity of the state law. It laid down some important principles worth reviewing. It said where automobiles were consigned to corporations within the state and were sold direct by the consignees from their storage warehouses in the state, they were not in interstate commerce after reaching the storage warehouses.

It defined an "automobile" as being a motor vehicle usually propelled by steam, electricity, or gasoline, and carrying is motive power within itself. And the word as used in the state laws of 1917, requiring a license tax for selling automobiles, includes motor trucks.

The motor car manufacturers attacked the state law requiring payment of a license tax to sell automobiles, as being unconstitutional. But the court held that such was not in violation nor conflict with the interstate commerce clause of the Federal Constitution.

The state law provides that four-fifths of such licenses need not be paid if the company selling has three-fourths of its assets invested in the state and returned for taxation therein. This law was attacked as violating the Federal Constitution in interfering with the privileges and immunities of citizens of the United States. But the court held that the term "citizen" as used in the Constitution referred only to natural persons, members of the body politic, owing allegiance to the state, and not to artificial persons created by a Legislature, as a corporation, and possessing only such attributes as the Legislature has prescribed.

Neither does this state law deny the equal protection of the laws to a foreign corporation in violation of the 14th Amendment to the Federal Constitu-

**S**EEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. *MOTOR AGE* presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty problems as may be submitted to him.

tion, said the court. While corporations are held to be "persons" within the equal protection and due process of law clause of this Amendment, they are not "citizens" within the privilege and immunities clause of that section.

The state statute was upheld and the manufacturers were required to pay the license taxes.

## Construction of Dealers' Guaranty to Keep Car in Repair— Shall It Be Treated as a Breach of Contract

### MUST GIVE NOTICE OF DEFECTS BEFORE SELLER IS REQUIRED TO REPAIR

Suing on his purchase contract Mark Berman sought to recover from the dealer the amount paid for an automobile. The contract contained two clauses of guaranty, one being that the machine should be delivered in good order and condition, and the other providing that it was understood and agreed "between both parties" that the dealer should keep it in repair for one year on account of any imperfections in the construction of said car at the time of delivery.

During the use of the car, a structural defect, which proved to be a flaw in the pump shaft, inside the pump, was developed. Now the question presented was, does the guaranty, in case of a structural defect, give the buyer the option of seeking the repairs or rescinding the trade?

Said the Supreme Court of Maine, in reversing the lower court, "It is common experience that any machine, however well made, may contain a structural defect, either in material or workmanship. Therefore, the one-year clause for the repair of 'imperfections in the construction' of the car was intended to differentiate the general clause to deliver 'in good order and condition' from the specific clause for the repair of hidden defects, whether of material or workmanship. The latter clause was intended to protect the seller from what could not in the very nature of things, be more obvious to him than to the buyer. Therefore it should be held to reserve to the defendant a reasonable opportunity to enable him to comply with the terms of the contract by making good a structural defect which neither party could anticipate or detect except upon greater or less use, rather than to be interpreted as a breach of contract at the option of the purchaser.

"It would seem incredible," said the court, "that either party intended that the buyer might use a car 364 days, and run it perhaps 10,000 miles, then rescind the contract and turn the car back upon the dealer, upon discovery at that time that when the car was delivered there was a structural imperfection. Concealment of such a defect might easily lead to fraud.

"The phrase 'between both parties,' found in the guaranty, is significant. The only way in which both parties could act would be for the buyer to give notice of the defects and the seller to repair. Unless the buyer gave notice of the defects, the dealer could not keep his part of the contract.

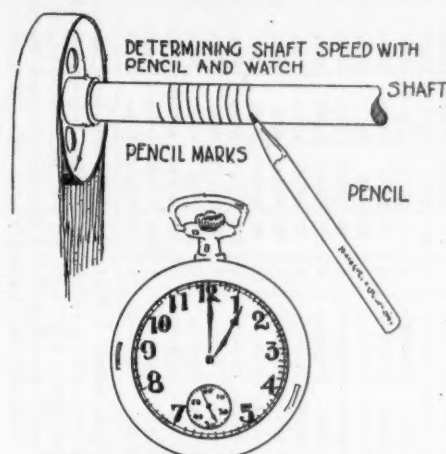
"Such a provision of guaranty imposes upon both parties mutual duties as above expressed. It was a covenant of good faith, that both the seller and purchaser should do the fair thing, in case of an unforeseen contingency.

"Now, the flaw in the pump shaft was clearly within the meaning of the contract as 'an imperfection in the constructions of said car at time of delivery. This being true it was incumbent upon the purchaser to notify the dealer that a fault had developed in the car, whereupon it was the duty of the dealer to investigate to discover the cause and properly repair, if within one year, and found to be a structural defect."



# The Automotive Repair Shop

## Practical Maintenance Hints



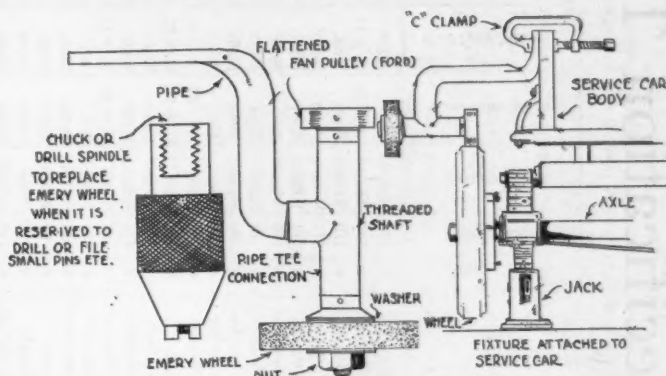
### Obtaining Shaft Speed Without Indicator

In the garage or shop it is sometimes desired to know the speed in revolutions per minute of shafting, emery wheel, grindstone or engine. As a revolution counter or speed indicator is a rarity in the small shop, the following method will give the revolutions per minute, without this tool or preliminary preparations.

With either a scribe or a lead pencil and a watch to keep time, the pencil or scribe is placed on the shaft or fly-wheel and moved to the right or left as the part rotates. This marks a number

At left is shown the method of finding the revolutions per minute of a shafting by means of a pencil and stop watch.

An ingenious scheme to operate an emery wheel or drill on the service car by attaching to the running board or body and obtaining power from the rear wheel



of circles similar to threads on a screw. By noting the time the marker is held in place, for instance, fifteen seconds, then counting these circles and multiplying by the figure to make up a minute, for fifteen seconds this is four, the revolutions per minute is determined.

### Details of a Shop Made Blow Torch

Blow torches are useful and also expensive. For these reasons the construction of a blow torch proves a profitable employment for a mechanic's spare time.

In the illustration is shown a torch made up mainly of discards, that will give as satisfactory results as any moderate priced torch.

The reservoir is made from a can, preferably a heavy sheet-iron container,

inasmuch as the heavier it is the greater the pressure that can be used for the ejector. A handle is made from a piece of thin brass tubing as shown and this is soldered to the can. The air filling valve is a discarded tire valve soldered air tight and firmly to the top of the reservoir. The rubber washers of the valve inside should be removed and small leather washers substituted, because the rubber does not last long in gasoline. A piece of quarter-inch copper tubing is secured by a reducer to a piece of half inch pipe and this part is secured to the top of the torch by means of a screwed and soldered connection.

A standard brass needle valve connects to a tubular brass burner, that is simply a brass tube with circular holes drilled through the sides.

Under the burner the drip cup attached is for the purpose of burning a small quantity of gasoline to heat up the burner when the torch is started. Mount the burner two to three inches above the top of the can to avoid melting the soldered connections when the torch is burning.

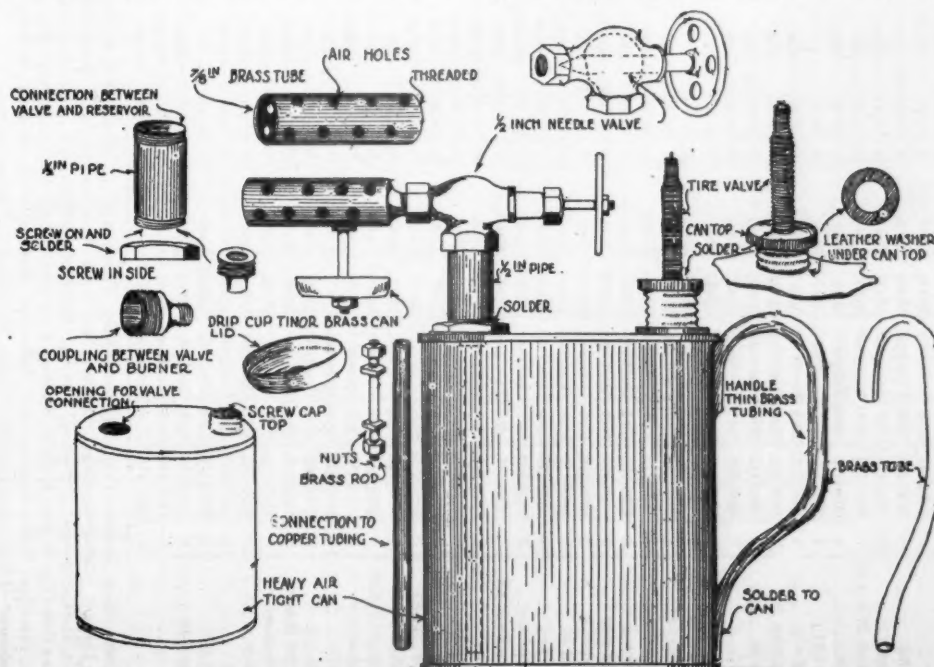
### Road Attachment for Service Car

Roadside repair work frequently necessitates grinding and drill work that makes the attachment illustrated a feature of worth while interest for the service car.

This fixture consists of a pulley attached to a threaded spindle and rotating in a spindle bracket, with clamps for fastening to the running board or body of the car.

The pulley is clamped on so that it bears against the tire of the rear wheel. By jacking up the wheel grinding, drilling and filing of bolts, valves, pins, etc., can be done.

This feature is simple in construction and will be found useful around the private garage, when no suitable machine is available.



Blow torch made in the shop from discarded materials

# Motor Age Monthly Passenger Car Specification Tables

These prices apply to five and seven-passenger models only.

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model	
Ace T. L.	5	2050	115	32x4	Firestone	3 1/2x5	H-S	6	25.35	1 1/2-Strom.	4.50	Detlaff	Warner	Detroit	Spacke	Gemmer	Stewart	Firestone	6	170	U. S. L.	A-L	G. & D.	A-L	A-K	6	Ace T. L.
American C	5	2295	127	32x4	Firestone	3 1/2x5	H-S	6	25.35	1 1/2-Ray.	4.50	B. and B.	Warner	Hart	Salisbury	Warner	V. Sicken	Firestone	6-8	100	Willard	G. & D.	Conn.	A-K	6-8	American C	
American Beauty	5	2450	121	33x4	Firestone	3 1/2x5	H-S	6	25.35	1 1/2-Ray.	4.90	B. and B.	Detroit	Acme	Timken	Standard	Warner	Firestone	6	110	Willard	West.	West.	A-K	6	American Beauty	
Anderson Series 30	5	2145	120	33x4	Goodrich	3 1/2x4	Cont.	6	25.35	Ray.	4.50	B. and B.	Warner	Ther-H	Salisbury	Jacob	Stewart	Firestone	6	111	Willard	West.	West.	Remy	6	Anderson Series 30	
Apperson Anniversary	7	4250	130	34x4	U. S.	3 1/2x5	Own	8	33.80	1 1/2-Ray.	4.25	Own	Own	Sterling	Own	Own	V. Sicken	Firestone	6	110	Willard	Bijur	Bijur	Remy	6	Apperson Anniversary	
Apperson 8-20	7	3500	130	34x4	Goodyear	3 1/2x5	Own	8	33.80	1 1/2-Ray.	4.25	Own	Own	Sterling	Own	Own	V. Sicken	Firestone	6	110	Willard	Bijur	Bijur	Remy	6	Apperson 8-20	
Argonne	4	8000	128	34x4	Goodrich	4x6	Duesenberg	6	25.60	1-Ray.	3.87	B. and B.	Special	Spicer	Stan-Par	Gemmer	Walther	Hook	6	115	Exide	West.	West.	Eise.	6	Argonne	
Auburn 6-39	4	1895	120	33x4	Goodrich	3 1/2x4	Cont.	6	25.35	1-Ray.	4.66	B. and B.	G-L	Hartford	Col.	Jacob	Stewart	Firestone	6	80	Willard	West.	West.	Remy	6	Auburn 6-39	
Beggs 6	5	2160	120	33x4	Goodrich	3 1/2x4	Cont.	6	25.35	1-Ray.	4.66	B. and B.	Warner	Arvac.	Stan-Par	Ditweiler	Stewart	Firestone	6	100	Exide	A-L	Conn.	A-K	6	Beggs 6	
Bell	5	1495	114	31x4	Miller	3 1/2x4	C. B. & S.	6	22.50	1-Ray.	4.50	Warner	Warner	Hart	Peru	Warner	Stewart	Firestone	6	90	Phila.	A-L	G. & D.	A-K	6	Bell	
Biddle B-5	5	3950	125	32x4	Firestone	3 1/2x5	Buda	6	22.50	1-Ray.	4.50	Warner	Warner	Spicer	Stan-Par	Gemmer	Warner	Firestone	6	90	Phila.	A-L	G. & D.	A-K	6	Biddle B-5	
Bour-Davis 20	5	1800	118	32x4	Goodyear	3 1/2x4	Cont.	6	25.35	1-Ray.	4.75	B. and B.	Detroit	Mechanics	Salisbury	C. A. S.	Stewart	Firestone	6	115	Willard	West.	West.	Remy	6	Bour-Davis 20	
Bour-Davis 21 S. & R.	7	2875	126	33x4	Goodyear	3 1/2x5	Cent.	6	29.40	1-Ray.	4.50	Muncie	Warner	Spicer	Salisbury	Lavine	Stewart	Firestone	12	80	U. S. L.	U. S. L.	West.	West.	West.	6	Bour-Davis 21 S. & R.
Brewster	4	9000	125	34x4	Kelly-S	4x5 1/2	Own	6	25.60	1-Ray.	4.50	Own	Own	Own	Own	Own	Stewart	Hayes	6	80	Prent.	A-L	Conn.	A-K	6	Brewster	
Briscoe 4-34	5	1285	109	31x4	optional	3 1/2x5	Own	4	18.23	1-Ray.	4.18	Own	Own	Own	Own	Own	Stewart	Hayes	6	80	Prent.	A-L	Conn.	A-K	6	Briscoe 4-34	
Buick K-6-45	5	1595	118	33x4	Goodyear	3 1/2x4	Own	6	27.34	Mar.	4.00	Own	Own	Own	Own	Own	A-C	Own	6	80	Willard	Delco	Delco	Delco	6-8	Buick K-6-45	
Buick K-6-49	7	1865	124	34x4	Goodyear	3 1/2x4	Own	6	27.34	Mar.	4.00	Own	Own	Own	Own	Own	A-C	Own	6	80	Willard	Delco	Delco	Delco	6-8	Buick K-6-49	
Cadillac 59	7	3940	132	35x5	optional	3 1/2x5 1/2	Own	8	31.25	1-Ray.	5.07	Own	Own	Spicer	C-Timk.	Col.	V. Sicken	Kelsey	6	118	Willard	West.	West.	Delco	6-3	Cadillac 59	
Case V	7	2630	126	34x4	Goodyear	3 1/2x5 1/2	Cont.	6	29.40	1-Ray.	4.45	Own	G-L	Peters	Col.	Jacob	V. Sicken	Firestone	6	118	Willard	West.	West.	Delco	6	Case V	
Chalmers 35-C	5	1945	117	32x4	optional	3 1/2x4	Own	6	25.35	1-Ray.	4.25	Own	Own	Own	Own	Own	Stewart	Stanwell	6	106	Willard	West.	West.	Delco	6	Chalmers 35-C	
Chalmers 35-B	5	1350	116	32x3	Goodrich	3 1/2x5	Lyco	4	19.60	1-Ray.	4.25	B. and B.	G-L	Peru	Peru	C. A. S.	Stewart	Stanwell	6	80	Willard	Delco	Delco	Delco	6	Chalmers 35-B	
Champion C-4	5	1550	118	32x4	Goodrich	3 1/2x5	H-S	6	19.60	1-Ray.	4.25	B. and B.	G-L	Peru	Peru	C. A. S.	Stewart	Stanwell	6	80	Willard	Delco	Delco	Delco	6	Champion C-4	
Champion S-4	7	1895	123	33x4	Goodrich	3 1/2x5	Own	6	29.40	1-Ray.	4.40	B. and B.	Own	Hartford	Own	Gemmer	Stewart	Firestone	6	105	Prent.	G. & D.	G. & D.	A-K	6	Chandler	
Chandler	5	795	102	31x4	Goodyear	3 1/2x4	Own	6	21.76	1-Ray.	3.63	Own	Warner	Own	Own	Warner	Stewart	Per-Jack.	6	80	Willard	A-L	Simms	Simms	6	Chevrolet 4-90	
Chevrolet 4-90	5	1295	110	33x4	Goodyear	3 1/2x5 1/2	Own	6	21.76	1-Ray.	4.42	Own	Warner	Mechanics	Own	Own	Stewart	Per-Jack.	6	80	Willard	A-L	Simms	Simms	6	Chevrolet F. B.	
Chevrolet F. B.	5	1485	112	32x4	Goodrich	3x4 1/2	Own	6	21.60	1-Ray.	4.45	B. and B.	North.	Own	Own	Warner	V. Sicken	Firestone	6	94	Prent.	G. & D.	G. & D.	A-K	6	Cleveland 40	
Cleveland 40	5	1550	117	32x4	Goodyear	3 1/2x5	H-S	6	19.60	1-Ray.	4.80	B. and B.	B-L	Hartford	Timken	Warner	V. Sicken	Firestone	6	120	Willard	West.	West.	A-K	6	Climber 4	
Climber 4	7	2450	120	33x4	Goodyear	3 1/2x5	Cont.	6	25.35	1-Ray.	4.75	B. and B.	B-L	Hartford	Timken	Warner	V. Sicken	Firestone	6	120	Willard	West.	West.	A-K	6	Climber 6	
Climber 6	7	3250	127	33x5	Firestone	3 1/2x4	North.	6	39.20	1-Ray.	4.45	North.	North.	Spicer	Col.	Gemmer	Warner	Firestone	6	50	Prent.	Delco	Delco	Delco	6	Cole Aero Eight 870	
Cole Aero Eight 870	5	1895	115	32x4	Firestone	3 1/2x4	Cont.	6	25.35	1-Ray.	4.75	B. and B.	Warner	Arvac	Col.	Gemmer	Stewart	Firestone	6	105	Prent.	A-L	Wagner	Wagner	6	Columbia C	
Columbia C	5	2350	125	33x4	Firestone	3 1/2x5 1/2	Cont.	6	29.40	1-Ray.	4.66	B. and B.	Warner	Muncie	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Wagner	6	Comet C-53	
Comet C-53	5	1495	117	32x4	Goodrich	3 1/2x5 1/2	Lyco	4	19.60	1-Ray.	4.25	B. and B.	G-L	Detroit	Peru	Gemmer	V. Sicken	Stanwell	6	105	Prent.	Dyn.	Dyn.	A-K	6	Commonwealth 4-40	
Commonwealth 4-40	7	3000	123	32x4	Goodrich	3 1/2x5 1/2	Cont.	6	29.40	1-Ray.	4.25	B. and B.	Covert	Ther-H	Peru	Ditweiler	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Conn.	6	Crawford 20-6-40	
Crawford 20-6-40	5	1395	117	32x3 1/2	Firestone	3 1/2x5	Lyco	4	19.60	1-Ray.	4.25	B. and B.	Covert	Ther-H	Peru	Ditweiler	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Conn.	6	Crow-Elkhart L-55-4	
Crow-Elkhart L-55-4	5	1645	117	33x4	Firestone	3 1/2x5	Ruten.	6	23.4	1-Ray.	4.25	B. and B.	Covert	Ther-H	Peru	Ditweiler	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Conn.	6	Crow-Elkhart H-55-6	
Crow-Elkhart H-55-6	7	4850	132	34x4 1/2	optional	3 1/2x5 1/2	Own	8	45.00	1-Ray.	4.08	B-L	Own	Spicer	Timken	Gemmer	Warner	Firestone	6	145	Willard	Delco	Delco	Delco	6	Cunningham V-4	
Cunningham V-4	7	2185	120	33x4	Goodrich	3 1/2x5 1/2	Own	8	39.20	1-Ray.	4.40	Own	Own	Spicer	Timken	Gemmer	Warner	Firestone	6	80	Willard	Delco	Delco	Delco	6	Daniels D	
Daniels D	5	1595	112	32x4	Fisk	3 1/2x5	H-S	6	25.35	1-Ray.	4.75	B. and B.	Warner	Peters	Timken	Warner	V. Sicken	Standard	6	80	Willard	Delco	Delco	Delco	6	Davis 51	
Davis 51	5	1185	114	32x3 1/2	optional	3 1/2x4	Own	6	24.08	1-Ray.	4.16	Own	Own	Own	Own	Own	J. Man.	Kelsey	12	50	Willard	N. E.	West.	West.	6	Dixie Flyer H-5-70	
Dixie Flyer H-5-70	5	1895	112	32x4	optional	3 1/2x4	Own	6	24.08	1-Ray.	4.16	Own	Own	Own	Own	Own	J. Man.	Kelsey	12	50	Willard	N. E.	West.	West.	12	Dodge Brothers	
Dodge Brothers	7	4350	132	33x5	Goodyear	4x5	Own	6	38.40	1-Ray.	3.50	Warner	Warner	Spicer	Timken	Ross	Stewart	Firestone	6	130	Willard	West.	West.	Boech	6	Dorris 6-80	
Dorris 6-80	5	1035	105 1/2	30x3 1/2	Goodyear	3 1/2x5 1/2	D-Lyco	4	19.60	1-Ray.	4.07	Own	Mechanics	Mechanics	Flint	Jacob	Stewart	Cleveland	6	95	U. S. L.	West.	West.	Conn.	6	Dort 15	
Dort 15	5	4000	124	32x4	Goodrich	3 1/2x5 1/2	Own	6	24.75	1-Ray.	4.45	Own	B-L	Spicer	Col.	Jacob	Stewart	Firestone	6	105	Exide	West.	West.	Eise.	6	du Pont A	
du Pont A	5	1895	115	33x4	Goodrich	3 1/2x4	Cont.	6	25.35	1-Ray.	4.50	B. and B.	Warner	Normal	Salisbury	Ditweiler	Stewart	Firestone	6	90	Willard	A-L	Conn.	Conn.	6	Economy 6-46	
Economy 6-46	5	1795	116	33x4	Firestone	3 1/2x4	Cont.	6	25.35	1-Ray.	4.50	B. and B.	Warner	Peters	Salisbury	Ditweiler	Stewart	Stanwell	6	90	Willard	Delco	Delco	Delco	6	Elcar 6	
Elcar 6	5	1495	116	33x4	Firestone	3 1/2x5	Lyco	4	19.60	1-Ray.	4.50	B. and B.	Warner	Peters	Salisbury	C. A. S.	Stewart	Stanwell	6	90	Willard	Delco	Delco	Delco	6	Elcar 4	

Engines—Ruten., Rutenber; Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunding; West., Westinghouse or Auto-Lite; W-L., Ward-Leonard; Dyn., Dyneto; N. E., North East; L-N., Leese-Neville; A-C., Allis-Chalmers; Split., Splittorf; S-H., Simme-Huff; G. & D., Gray & Davis. Ignition—A-K., Alwater-Kent; Conn., Connecticut; Eise., Eismann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splittorf. Gearset—G-L., Grant-Less; North., Northway; B-L., Brown-Lipe. Rear Axle—Col., Columbia; W-Weis, Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott, Weston-Mott. Universals—Hart., Hartford; Ther-H., Thermoid-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man., Johns-Manville; V-Sicken, Van Sicken; A-C., Allis-Chalmers.



Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor Size and Make	Gear Ratio	Clutch	Gears	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volta	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltage	Name and Model	
Elgin Series K.....	5	1665	118	33x4	optional	31x4 1/2	Falls	6	23.44	1-Stron.	5.09	B. and B.	Mechanics	Mechanics	Col.	C. A. S.	V. Sicklen	Firestone	6	90	Willard	Wagner	Wagner	Wagner	6	Elgin Series K	
Essex A.....	5	1795	108 1/2	32x4	optional	31x5	Own	4	18.23	1-Stron.	5.09	Own	Own	Own	Col.	Gemmer	Stewart	Kelsey	6	105	Exide	Delco	Delco	Delco	6	Essex A	
Fergus.....	6	126	126	32x4	optional	31x5	Cont.	6	25.35	1-Stron.	4.75	B. and B.	G-L	Peters	Col.	Gemmer	Stewart	Firestone	6	120	Willard	L-N	L-N	L-N	6	Fergus	
Ferris.....	6	3390	130	32x4 1/2	Firestone	31x5 1/2	Cont.	6	29.40	1-Stron.	4.75	Own	Own	Own	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Own	Own	Own	6	Ferris	
Fiat.....	7	136	136	35x5	.....	.....	Own	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	Ford T	
Ford T.....	5	575	100	30x3 1/2	optional	31x4	Own	4	22.50	1-H-K	4.75	Own	Own	Own	Col.	Gemmer	Stewart	Firestone	6	80	opt.	Own	Own	Own	6	Ford T	
Franklin 9-B.....	5	3100	115	32x4	Goodyear	31x4	Own	6	25.35	1-Stron.	4.33	B. and B.	Mechanics	Own	Col.	Gemmer	Stewart	Firestone	6	87	Willard	Dyn.	West.	West.	15	Franklin 9-B	
Gardner.....	5	1196	112	32x3 1/2	Goodyear	31x5	Own	4	19.60	1-Carter	4.33	B. and B.	Mechanics	Own	Col.	Gemmer	Stewart	Firestone	6	88	Willard	Dyn.	West.	West.	15	Gardner	
Geromino.....	5	1905	122	32x4	Goodyear	31x5	Ruten.	6	23.44	1-Stron.	4.5	B. and B.	G-L	Hart	Col.	Gemmer	Stewart	Firestone	6	90	Pres.	Bijur	A-K	A-K	6	Geromino	
Grant H-X.....	5	1750	116	32x4	optional	31x4 1/2	Walker	6	22.52	1-Stron.	4.63	B. and B.	Durston	Spicer	Col.	Gemmer	Stewart	Firestone	6	80	Pres.	Bijur	A-K	A-K	6	Grant H-X	
Hanson 54-A.....	5	2165	121	32x4	optional	31x4 1/2	Cont.	6	25.35	1-Mar.	4.00	B. and B.	Covert	Spicer	Col.	Gemmer	Stewart	Firestone	6	80	Pres.	Bijur	A-K	A-K	6-8	Hanson 54-A	
Harron A-A-2.....	5	1195	108	30x3 1/2	Miller	31x5 1/2	Own	4	16.90	1-Stron.	4.00	Own	G-L	Own	Col.	Gemmer	Stewart	Firestone	6	80	Pres.	Bijur	A-K	A-K	6-3	Harron A-A-2	
Harvard 4-20.....	2	850	100	28x3	.....	.....	H-S	12	36.30	1-Zen.	4.12	B. and B.	G-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	120	Willard	L-N	L-N	L-N	6	Harvard 4-20	
Hatfield A-42.....	7	1695	115	32x4	Firestone	31x5	Own	12	36.30	1-Ray.	4.77	B. and B.	Own	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	L-N	L-N	L-N	6	Hatfield A-42	
Haynes 48.....	7	3635	132	34x4 1/2	optional	31x5	Own	12	36.30	1-Ray.	4.77	B. and B.	Own	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	L-N	L-N	L-N	6	Haynes 48	
Haynes 47.....	7	2935	132	34x4 1/2	optional	31x5	Weld	6	29.40	1-Stron.	4.41	Fuller	Fuller	Own	Col.	Gemmer	Stewart	Firestone	6	80	U. S. L.	Willard	Delco	Delco	6	Haynes 47	
H. C. S. Special.....	4	2950	120	32x4	Goodrich	31x5 1/2	Cont.	6	25.35	1-Zen.	4.41	Fuller	Fuller	Own	Col.	Gemmer	Stewart	Firestone	6	80	U. S. L.	Willard	Delco	Delco	6	H. C. S. Special	
Holler 206-B.....	5	1985	120	32x4	Goodyear	31x4 1/2	Own	6	29.40	1-Newc.	4.40	B-L	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	12	Holler 206-B	
Holmes.....	7	3350	126	34x4 1/2	Goodyear	31x4 1/2	Own	6	29.40	1-Newc.	4.40	B-L	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	12	Holmes	
Hudson O.....	7	2600	125	34x4 1/2	optional	31x5	Own	6	29.40	1-Newc.	4.40	B-L	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	6	Hudson O	
Huffman R.....	5	1965	120	32x4	Firestone	31x4 1/2	Cont.	6	25.35	1-Stron.	4.45	B. and B.	Covert	Flexite	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	6	Huffman R	
Hupmobile R.....	5	1685	112	32x4	Goodyear	31x5 1/2	Cont.	6	25.35	1-Stron.	4.87	Own	Own	Detroit	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	6	Hupmobile R	
Jackson 6-38.....	5	1685	112	32x4	Goodyear	31x5 1/2	Cont.	6	25.35	1-Stron.	4.87	Own	Own	Detroit	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	6	Jackson 6-38	
Jaquet, Royal.....	5	121	33x4	Goodyear	31x4 1/2	31x5 1/2	Cont.	6	25.35	1-Stron.	4.87	Own	Own	Detroit	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Dyn.	West.	West.	6	Jaquet, Royal	
Jones 28.....	5	124	33x5	.....	.....	.....	Own	4	28.90	1-Ray.	4.50	B. and B.	G-L	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Delco	Delco	Delco	6	Jones 28	
Jordan F.....	7	2750	126	32x4 1/2	Goodyear	31x5 1/2	Cont.	6	29.40	1-Ray.	4.50	B. and B.	G-L	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Delco	Delco	Delco	6	Jordan F	
Jordan M.....	5	2975	127	32x4 1/2	Goodyear	31x5 1/2	Cont.	6	29.40	1-Ray.	4.50	B. and B.	G-L	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Delco	Delco	Delco	6	Jordan M	
Kenworthy 4-80.....	5	2850	120	32x4	Goodyear	31x4 1/2	Cont.	6	25.35	1-Stron.	4.66	B-L	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	140	Exide	West.	West.	West.	6	Kenworthy 4-80	
Kenworthy 6-55.....	5	3900	130	32x4 1/2	optional	31x5 1/2	Cont.	6	29.40	1-Stron.	4.10	B-L	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	140	Exide	West.	West.	West.	6	Kenworthy 6-55	
King H.....	7	3475	124	32x4 1/2	Goodyear	31x5 1/2	Own	8	28.90	1-Ball	4.08	Detroit	Own	Ther-H	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Delco	Delco	Delco	6	King H	
Kissel.....	7	3475	124	32x4 1/2	Goodyear	31x5 1/2	Own	8	28.90	1-Ball	4.08	Detroit	Own	Ther-H	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Delco	Delco	Delco	6	Kissel	
Klinecar 6-55-J.....	5-7	2285	121	33x4	Goodyear	31x4 1/2	Cont.	6	25.35	1-Ray.	4.50	B. and B.	G-L	Flexite	Col.	Gemmer	Stewart	Firestone	6	90	Pres.	Wagner	Wagner	Wagner	6	Klinecar 6-55-J	
LaFayette.....	7	.....	132	33x5	Firestone	31x5 1/2	Own	8	33.80	2-Own	.....	Own	Own	Own	Col.	Gemmer	Stewart	Firestone	6	90	Pres.	Wagner	Wagner	Wagner	6	LaFayette	
Leach 20-A.....	5	5200	126 1/2	32x4 1/2	Goodyear	31x5 1/2	Cont.	6	29.40	1-Ray.	4.50	B-L	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	180	Pres.	Delco	Delco	Delco	6-8	Leach 20-A	
Lexington S.....	5	2185	122	32x4	optional	31x4 1/2	Cont.	6	25.35	1-Ray.	4.66	B. and B.	Warner	Warner	Spicer	Col.	Gemmer	Stewart	Firestone	6	100	Willard	G-D	G-D	G-D	6	Lexington S
Liberty 10-C.....	5	1985	117	32x4	Goodyear	31x5	Own	6	23.44	1-Stron.	4.66	B. and B.	Warner	Warner	Spicer	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Wagner	Wagner	Wagner	6	Liberty 10-C
Locomobile 48.....	7	8900	142	35x5	optional	31x5 1/2	Own	6	48.60	1-Stron.	3.80	Own	Own	Spicer	Col.	Gemmer	Stewart	Firestone	6	140	Exide	West.	West.	West.	6	Locomobile 48	
Lorraine.....	5	1575	114	32x4	Republic	31x5	H-S	4	19.60	1-John.	4.75	B. and B.	G-L	Acme	Col.	Gemmer	Stewart	Firestone	6	94	U. S. L.	Willard	Delco	Delco	6	Lorraine	
Maiborn B.....	5	1595	116	32x4	Fisk	31x4 1/2	Falls	4	23.44	1-Till.	4.50	B. and B.	G-L	Acme	Col.	Gemmer	Stewart	Firestone	6	94	U. S. L.	Willard	Delco	Delco	6	Maiborn B	
Marmon 34.....	5	5000	136	32x4 1/2	optional	31x5 1/2	Own	6	33.75	1-Stron.	3.75	Own	Own	Spicer	Col.	Gemmer	Stewart	Firestone	6	162	Willard	Delco	Delco	Delco	6	Marmon 34	
Marshall K.....	5	1295	117	32x3 1/2	Firestone	31x5	Lyco.	4	19.60	1-Zen.	3.75	B. and B.	G-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	160	Willard	Dyn.	Dyn.	Dyn.	6	Marshall K	
Maxwell 25.....	5	1155	109	30x3 1/2	.....	.....	Own	4	21.03	1-Stron.	4.50	Own	Own	Own	Col.	Gemmer	Stewart	Firestone	6	87 1/2	Willard	Dyn.	Dyn.	Dyn.	6	Maxwell 25	
McFarland 127.....	7	5100	136	35x5	Goodrich	41x6	T-Mof	6	48.60	1-Stron.	3.58	B. and B.	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	120	Willard	West.	West.	West.	6	McFarland 127	
Mercer Series 5.....	6	4050	132	32x4 1/2	optional	31x5 1/2	Own	4	22.50	1-Ball	3.60	Own	Own	Spicer	Col.	Gemmer	Stewart	Firestone	6	182	Willard	West.	West.	West.	6	Mercer Series 5	
Meteor K R.....	4	5500	129	32x4 1/2	optional	4x6	Duesen.	4	25.60	1-Zen.	4.41	B. and B.	Own	Own	Col.	Gemmer	Stewart	Firestone	6	110	Willard	Bijur	Bijur	Bijur	6	Meteor K R	
Mets Master 6.....	5	1895	120	32x4	Goodrich	31x5	Ruten.	6	23.44	1-Stron.	4.63	B. and B.	B-L	Hart	Col.	Gemmer	Stewart	Firestone	6	90	Willard	Delco	Delco	Delco	6	Mets Master 6	
Mitchell F-40.....	5	1750	120	33x4	31x5 1/2	31x5 1/2	Own	6	25.35	1-Ray.	4.41	B. and B.	Own	Own	Col.	Gemmer	Stewart	Firestone	6	110	Willard	Delco	Delco	Delco	6	Mitchell F-40	
Monitor M. & Ser. 3.....	5	2475	121	33x4	Miller	31x4 1/2	Cont.	6	25.35	1-Stron.	4.50	Own	Own	Universal	Col.	Gemmer	Stewart	Firestone	6	80	U. S. L.	Willard	Delco	Delco	6	Monitor M. & Ser. 3	
Monroe 5-9.....	5	1440	115	32x3 1/2	Goodyear	31x4 1/2	Own	4	16.90	1-Zen.	4.50	Own	Own	Universal	Col.	Gemmer	Stewart	Firestone	6	80	U. S. L.	Willard	Delco	Delco	6	Monroe 5-9	
Moore 6-48.....	5	2385	122	32x4	Miller	31x4 1/2	Cont.	6	25.35	1-Ray.	4.66	B. and B.	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	110	Exide	Delco	Delco	Delco	6	Moore 6-48	
Moore 6-48.....	7	2950	125	32x4 1/2	Miller	31x5 1/2	Cont.	6	29.40	1-Ray.	4.45	B. and B.	B-L	Spicer	Col.	Gemmer	Stewart	Firestone	6	110	Exide	Delco	Delco	Delco	6	Moore 6-48	

Engines—Ruten; Cont., Continental; Weid, Weidely; North, North; Herschell-Spillman; Lyco, Lycoming; D-Lyco, D-Lyco; Spitzer, Spitzer; T-Mof, T-Mof; Mercer Series 5, Mercer Series 5; Meteor K R, Meteor K R; Mets Master 6, Mets Master 6; Mitchell F-40, Mitchell F-40; Monitor M. & Ser. 3, Monitor M. & Ser. 3; Monroe 5-9, Monroe 5-9; Moore 6-48, Moore 6-48; Moon 6-48, Moon 6-48; R. & V., Root & Van Dervoort. Carburetor—Strom, Stromberg; Zen, Zenith; Ray, Rayfield; John, Johnson; Mar, Marvel; Sund, Sundman; Slew, Stewart; H-K, Holley-Kington; Newc, Newcomb; Scheb, Schebler; Tilot, Tiloton; John, Johnston. Fuel feed vacuum except where otherwise indicated. \*Pressure. #Gravity. Generator and Motor—A-L, Auto-Lite; West, Westinghouse or Auto-Lite; W-L, Ward-Leonard; Dyn, Dyneto; N. E., North East; L-N, Leeco-Neville; A-C, Allis-Chalmers; Split, Splitdorf; S-H, Simme-Huff; G. & D., Gray & Davis. Ignition—A-K, Atwater-Kent; Conn, Connecticut; Elie, Elie; Eisemann, West, Westinghouse; Will, Willard; N. E., North East; K-Remy, Kingston-Remy; Berl, Berling; Bosch-W, Bosch-Westinghouse; Split, Splitdorf. Gearset—G-L, Grant-Lee; North, Northway; B-L, Brown-Lipe. Rear Axle—Col, Columbia; W-Weiss, Walker-Weiss; C-Tink, Cadillac-Timken; West-Mott, Weston-Mott. Universals—Hart, Hartford; Ther-H, Thermo-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man, John-Manville; V-Sicklen, Van Sicklen; A-C, Allis-Chalmers.

# From the Four Winds

## Glimpses at the World of Motordom

### Coming Motor Events

#### AUTOMOBILE SHOWS

Milwaukee.....	Annual Fall Automobile Show.....	Aug. 30-Sept. 4
Indianapolis.....	Fall Automobile Show.....	Sept. 6-11
Northampton, Mass.....	Annual Automobile Show.....	Oct. 6-8
Jersey City, N. J.....	Annual Automobile Show.....	Nov. 1-6
New York.....	National Passenger Car Show.....	Jan. 8-15, 1921
Chicago.....	National Passenger Car Show.....	Jan. 29-Feb. 4, 1921

#### FOREIGN SHOWS

Antwerp.....	Commercial Vehicles, Tractors, Trucks and Engines.....	June 26-July 25
London.....	Commercial Vehicles, Exhibition, Olympia.....	October
London.....	Passenger Car Show, Olympia.....	November

#### RACES

Hanford, Cal.....	Dirt Track.....	July 4
Spokane, Wash.....	Dirt Track.....	July 4
Tacoma, Wash.....	Speedway Race.....	July 5
Batavia, N. Y.....	Dirt Track.....	July 5
Warren, Pa.....	Dirt Track.....	July 17
Watertown, N. Y.....	Dirt Track.....	July 24
Fulton, N. Y.....	Dirt Track.....	July 31
Paris, France.....	Grand Prix Race, Sporting Commission.....	August
Eric, Pa.....	Dirt Track.....	Aug. 7
Buffalo, N. Y.....	Dirt Track.....	Aug. 14
Johnstown City, Pa.....	Dirt Track.....	Aug. 21
Elgin, Ill.....	Road Race.....	Aug. 21
Middletown, N. Y.....	Dirt Track.....	Aug. 20-21
Flemington, N. J.....	Dirt Track.....	Aug. 27-28
Canandaigua, N. Y.....	Dirt Track.....	Aug. 28
Hornell, N. Y.....	Dirt Track.....	Sept. 6
Uniontown, Pa.....	Speedway Race.....	Sept. 6
Syracuse, N. Y.....	Dirt Track.....	Sept. 17-18
Allentown, Pa.....	Dirt Track.....	Sept. 25

#### TOURS

Lake Huron Tour.....	Michigan Pikes Assn.....	July 4
New York-San Francisco.....	Glidden Tour.....	September
Milwaukee, Wis.....	Annual Fall Automobile Show.....	Aug. 30-Sept. 4
Detroit.....	Good Roads Assn. Tour.....	July 14-20

#### Cities Want Part of State Tax Money

—Convinced that municipalities should receive a portion of the money paid by the owners of motor cars, as license tax to the State, since city streets are, in many instances, subjected to more wear by the machines than are the county roads, a committee from the League of Third Class Cities will appear at the next session of the Pennsylvania legislature with a bill providing for the return of a certain portion of the automobile license fund. An effort will be made to have the boroughs co-operate in this attempt to secure some of the automobile money for the cities. The league has in mind particularly the license fees paid by the owners of trucks in cities. The league will meet in York, Pa., in August.

**Pennsylvania Hard After Motor Law Violators**—Records of violators of the Pennsylvania state motor laws are being closely kept by the state police. Major Lynn G. Adams, superintendent of the state police, has just announced. The state highway department and the state police are now co-operating in an effort to rid Pennsylvania highways of reckless drivers and wanton violators of the motor laws. The highways now are pa-

trolled by seventy men in the motorcycle squad and a large force of plain cloths and uniformed police. Drivers charged with minor violations of the law will be dismissed with a warning on the first offense; the second offense will bring prosecution and the third infraction will cost the motorist his license.

A careful record of repeated offenders is being kept through a card index system. Driving while intoxicated is an offense that is being punished to the limit.

**Louisville Rapidly Motorizing**—Rapidly with which Louisville is becoming motorized is shown in the dearth of applications for licenses for horse-drawn vehicles this year. The number has decreased thirty-three per cent since last year, it was announced to-day by L. D. Baldouf, secretary of the sinking fund. The change from wagons to motor trucks was most noticeable in delivery vehicles of grocers and stores, he stated.

**Buses Fight Car Strike**—Municipal bus service has been started at Dayton, O., to take the place of the street cars tied up by strike, and 300 small automobiles are being operated in conjunction with the busses. Regular schedules are being maintained and a straight fare of five cents with free transfers is the rule. Some little confusion has resulted, but as an emergency service the bus and automobile system is proving satisfactory.



**HE WHO RUNS MAY READ**—Evanston has a well filled public library, but came to the conclusion that many of its people were not able to take advantage of its benefits through lack of time to go there. So it was decided that if the man couldn't go to the library, the library should go to the man. The result is shown above in the form of a motor car, well stocked with books, making the rounds